E. Engineering Lib.
U. of Mich. Edwin M. Baker
11-11-43
v. 6

Products Finishing

FRED W. VOGEL, Editor

Volume 6 JANUARY, 1942 Number 4

Published monthly by
Gardner Publications, Inc.
431 Main St.
Cincinnati, Ohio

•

DON G. GARDNER
President and
General Manager

•

JOHN M. KRINGS
Advertising Manager

GEORGE E. HAY
431 Main St., Cincinnati
MAin 0182

G. M. FILLMORE
ROBERT E. AHRENSDORF
342 Madison Ave.
New York
Murray Hill 6-3899

GEORGE H. MEYERS
Tribune Tower, Chicago
Superior 2290

Member

ECA

Printed
in U. S. A.

Copyrighted

CONTENTS

Editorial 9

Rectifiers and Reverse Current Cleaning..... 10
By HAROLD LEEVER and JOHN C. BOGLE

Helping the Housewife Take Pride in Her Kitchen Range..... 20
By E. A. LINDEMANN

New Plant Produces Clean Clay for Porcelain Enameling 28

Barrel Finishing of Metal Products..... 40
By H. LEROY BEAVER

Modern Gold Plating—Part 16..... 46
By JOSEPH B. KUSHNER

Electroplating Past and Forecast..... 58
By BUZZ BARR

Industrial Finishing Progress..... 66
By GUSTAVE KLINKENSTEIN

The 1941 Finishing Review..... 68

Opportunity Section 101

For Your Catalog Library.....102

Index to Advertisements.....104

More Than 16,000 Circulation This Issue

SPEED UP

YOUR DEFENSE OUTPUT WITH

COWLES CLEANERS

Clean all metal surfaces

—QUICKER!

—BETTER!

—RIGHT THE FIRST TIME!

THE COWLES DETERGENT COMPANY
CLEVELAND, OHIO

Mail this coupon TODAY!

The Cowles Detergent Company, *Metal Cleaner Department*
7016 Euclid Ave., Cleveland, Ohio

What do you recommend for this type of cleaning? _____

Company _____

Street and No. _____

City and State _____

Signed _____

Title or Department

AS in previous years, a portion of this issue has been allotted to a review of the achievements of those engaged in the metal finishing field. During peace times these achievements would have been extremely important but under the circumstances which prevailed for the past several months, the achievements take on added significance.

In reviewing the developments of the past twelve months it is encouraging to note the amount of effort that has been directed toward the expansion of our production facilities and toward making our nation the strongest on earth. In every branch of the metal finishing field automatic equipment has been devised. Automatic mechanisms have been developed for polishing and buffing requirements and the automatic processing of parts through the various stages of electroplating has been developed to a high degree of efficiency. Enameling and painting operations of all kinds have been expedited by means of newly developed processing equipment.

As emphasized many times before, one factor remains responsible for these developments—unfettered research. Research has been responsible for the marvelous developments of the past year and research will continue to point the way to better methods and finer ultimate results in the finishing field.

There is no question that the urgent demands for more planes, more tanks and more ships will be met successfully in the metal finishing plant and department of 1942.

WE take occasion, this month, to acknowledge the valuable share which H. Leroy Beaver has had in building up Products Finishing to the place it now enjoys in the metal finishing field. Since February, 1937 the articles in his series "Barrel Finishing of Metal Products" have appeared regularly in each issue of Products Finishing, and through them Mr. Beaver has presented to the industry a wealth of information on this subject, drawn from a lifetime of experience in this particular branch of metal finishing.

The magnificent contribution he has made to the field of metal finishing is unparalleled in modern technical publishing and stands as one of the most informative works of its kind. The importance of this subject and the reception accorded to Mr. Beaver's articles is indicated by the fact that during these five years, thousands of letters have been received from all over the world asking for additional information on individual phases of barrel finishing practice or for answers to difficult problems.

A five-years-long series contains a lot of articles; still, it seems too bad that he should stop when we know that he possesses a vast fund of information on this subject upon which he has never touched.

However, his name will be continued on our mast head as consulting editor and we know that he will be glad to answer any inquiries on the subject of Barrel Finishing.

Rectifiers and Reverse Current Cleaning

By HAROLD LEEVER, MacDermid, Inc., and JOHN C. BOGLE, Udylite Corp.

FOR years it was customary, in electrocleaning, to attach the work to the negative bus, with the positive bus attached to the tank or to electrode bars hanging parallel to the inside surface of the cleaner tank. Thus the work was at cathode potential following the rule that **"current always leaves a solution through the cathode,"** and the electrodes being at anode potential were quite naturally called anodes.

But it was also quite customary for each cleaner tank, so connected, to be provided with a reversing switch, so that for a short time, at the end of the direct-cleaning cycle, the work was connected to the positive bus, thus being held at anode potential, whereas the electrodes inside the tank were transferred to cathode potential.

This naturally caused considerable misunderstanding among the platers, who regard an anode as an anode, not something that changes with the flick of a switch. Consequently with the growth of reverse-current cleaning during the past three or four years, we still find the platers calling those electrodes which are permanently in the cleaner tank "anodes," despite their being at cathode potential.

The foregoing discussion might be termed description carried to the point of redundancy, however, it is necessary, before we enter a discussion of reverse-current cleaning, to define our terms with considerable care. Thus, reverse or anodic cleaning means that the work to be cleaned is positive, just the opposite polarity that the work would have in the plating process.

As stated, the great growth of reverse-current cleaning has occured in the last three or four years. This development has closely paralleled the introduction of the dry-disk rectifiers into the plating room, and it has been found that the rectifier has solved some of the equipment and operation problems ordinarily encountered in reverse or anodic cleaning.

A great many platers attempting reverse cleaning for the first time, have been badly disappointed that the work seemed to discolor in the cleaning process and that apparently nothing they could do would overcome this tendency. It is admitted that the reverse process is no great panacea for all the evils of cleaning, and it is only after this fact is clearly grasped that the new process, when used with proper discrimination, provides a distinct forward step in the cleaning art. And in this discriminatory use, the modern dry-disk rectifier is proving of great value.

The history leading up to the present reverse- cleaning technique begins with a process involving direct pre-cleaning, followed with a "shot"

of reverse current to remove the smut due to dissolving and redepositing of metals in the direct process.

The next step was primary reverse cleaning using the familiar cleaners previously employed in the direct process. This method was applied to steels not heavily coated with dried-on compounds. Using the cleaners thus not adapted primarily to direct-cleaning, the greatly reduced ebullition of gas at the surface of the work in anodic cleaning led to the application of 12 volts on the cleaner instead of 6 volts to increase the gassing and, hence, the effectiveness of the cleaning.

The final development in the reverse process was the substitution of cleaners especially designed for the particular duty involved, namely, a reverse cleaner compound for reverse cleaning. These cleaners, in addition to other factors which will be discussed later, possess the advantage of considerably higher electrical conductivity than the older cleaners at acceptable concentrations, thus, at one stroke, making 12 volts unnecessary in any form of cleaning.

A dry-disk rectifier is customarily built to supply its output at a choice of two voltages. If connected to deliver D.C. energy at 6 volts, a given rectifier will deliver double the current available from the same rectifier at 12 volts.

Cleaning is largely proportional to the rate of gassing at the surface of the work, and anodic gassing is in proportion to the anodic current density. If it requires 12 volts with a cleaner of low conductivity to produce the same or less anodic gassing as with a modern, high conductivity cleaner under 6 volts, then the rectifier will be twice as effective in prompting rapid cleaning when the high conductivity cleaner is employed.

For steel parts where the polishing compound is removable with ordinary ease, reverse-current cleaning may be employed advantageously with

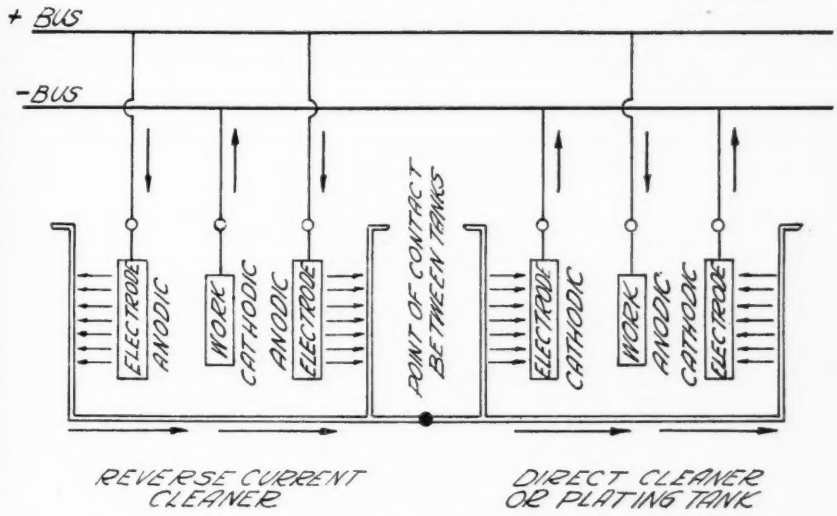


Fig. 1—Reverse and direct cleaners on same bus, tanks not insulated apart. Arrows indicate direction of short-circuit current.

current densities even as high as 80 to 100 amperes per square foot. Thus a cleaner tank seven or eight feet long and of proportionate width and

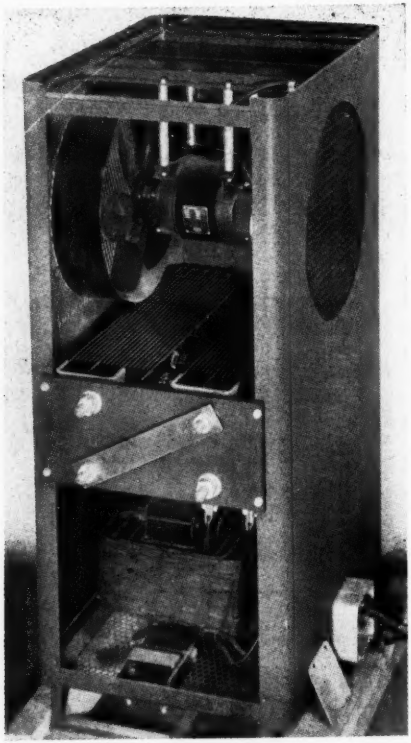


Fig. 2—Illustration showing rectifier with two separate insulated bridges.

depth, may use currents up to 1200 or 1400 amperes. Ordinarily, to improve the effectiveness and speed of cleaning such a unit may be advantageously inserted in a plating production and wherever space permits.

A rectifier of approximately the same current capacity when taken in connection with such a tank, supplies an ideal combination for these parts, for its low space requirement and the proximity with which it can be located with respect to the cleaner tank permitting the addition without greatly affecting the old layout.

The following factors are directly proportional to the degree of effectiveness made possible by reverse cleaning:

1. Precleanliness.
2. Time of cleaning.
3. Anodic current density.
4. Concentration of compound.

When the polishing compound is heavily dry-caked on the surface of the work, a violent reverse cleaning may produce corrosion around the "gobs" of compounds. This "ringing" tendency is usually eliminated in the subsequent pickling operation, but in exceptionally aggravated cases it may remain as a discoloration, even with steel, and other measures should be employed. Also, in the case of soft metals, reverse-current cleaning must be employed with a measure of caution, as the tendency to discolor is more marked with the non-ferrous materials. This effect can be controlled to some extent by adjustment of the buffer in the cleaner compound, but the best practice is rather to preclean non-ferrous materials with a degreaser, a solvent emulsion or a direct cleaner, followed by a closely limited time in the reverse cleaner.

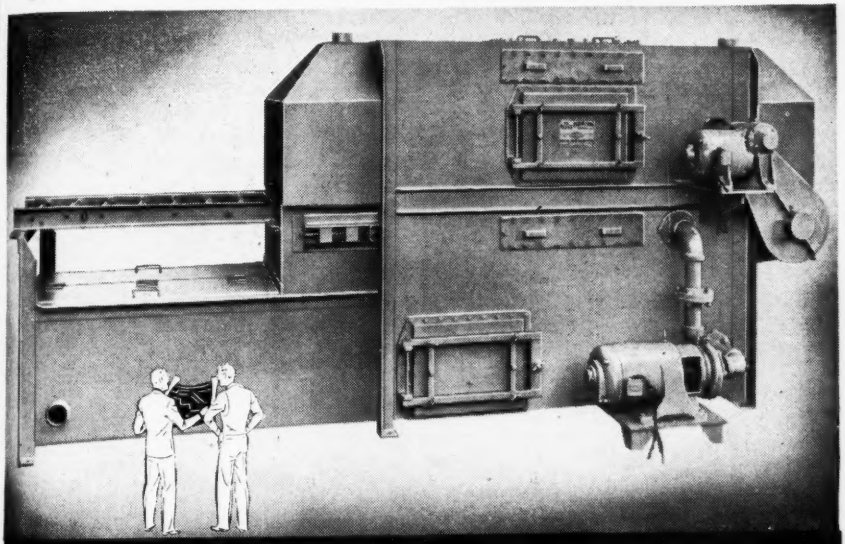
In this connection it is never considered good practice to use the same solution for both the direct and reverse processes. No cleaner compound is adaptable to the wide extent that it may be used for both duties. This consideration precludes the advisability of using a single tank, equipped with reversing switch. It is markedly better to provide two tanks, side by side, one for reverse cleaning and one for direct cleaning. These tanks being at opposite potential are ordinarily prone to stray current difficulties. Here the rectoplater of proper size is of tremendous advan-

The Most Efficient Way TO CLEAN METAL PARTS!

FASTER CLEANING before and after heat treating . . . A lower-cost cleaning agent . . . No toxic effects . . . A surprisingly large saving in washing solution gallonage . . . All these important advantages and many others are yours with an Alvey-Ferguson Washing Machine!

Whatever the size and shape of your parts or products, whatever the problem — washing, rinsing, drying, soaping, rust proofing, oil sludging — you can do it more efficiently and save money over a longer period of time with Alvey-Ferguson equipment.

Write or wire for a discussion of your cleaning problems without obligation on your part. Or write today for our new "Washing Machine Handbook and Engineers' Guide." The Alvey-Ferguson Company, 611 Disney Street, Cincinnati, Ohio.



CONVEYING A-F MACHINERY

ALVEY-FERGUSON
PRODUCT WASHING MACHINES AND *Conveyors*

tage in providing insulation between tanks overcoming short circuits and stray currents, recognized as one of the most troublesome annoyances in the whole plating art. See Fig. 1.

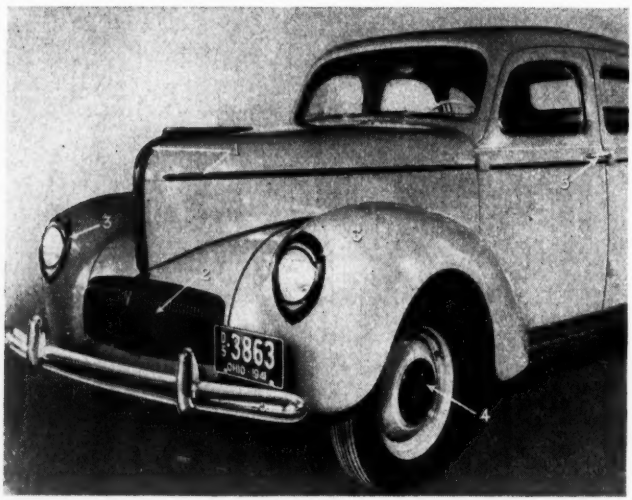
Where a whole plating room or section thereof is fed from one pair of 6 volt bus bars, the steel of the reverse tank is at opposite potential from the steel of the direct cleaning tank, or the steel of the various plating tanks. Not only is it necessary to provide insulation between tanks themselves, but also in the various heating and cooling pipes that join these tanks electrically.

Such insulation is a constant source of maintenance and repair. The condition is most disagreeable when we have the tank steel charged cathodically instead of separate electrodes being used as cathode in the reverse tank and as anode in the direct tank for, unless insulation is maintained with the greatest care, the two steel tanks being brought into contact with one another through the steel of the building, can produce a disastrous short on the whole bus system. Rectifiers, however, provide an economical way of realizing D.C. energy in small blocks, each block insulated from the other by the design of the rectifier bridges themselves.

Thus, if two tanks of opposite polarity be fed, each from a separate rectifier or each from a separate bridge of the same rectifier, there will be no tendency for stray currents to wander from tank to tank, no matter if the tanks are tied solidly together by pipes, building steel or by work incautiously stacked against them. A rectifier provided with two bridges, insulated one from the other, each capable of feeding a tank of opposite polarity without stray currents, is shown in Fig. 2.

At the present time, special problems of cleaning arise rapidly as we progress further into the defense program. Right now, due to a shortage of other material, considerable interest in being focussed upon bright zinc and tin as a substitute for nickel in decorative work.

Although a great deal of development has been expended upon bright



America's "chromeless" automobile — developed to comply with the recent OPM edict to ban bright metal trim. "Colorized" treatment replaces chrome, as shown, with hood ornamentation and striping (1), radiator grill (2), lamp rims (3), hub caps (4) and door handles (5) sporting dark lacquer to contrast light body shades.

METAL FINISHING SERVICE FOR TODAY.. *and Tomorrow*

There's no set pattern for the solution of today's metal finishing problems — whether caused by a shortage of raw materials, trouble shooting of existing over-worked equipment, change-overs to meet defense demands, or other unusual situations. However, regardless of what your plating difficulties may be, Hanson-Van Winkle-Munning will help solve them for today's defense necessities and tomorrow's market—by tried methods or new tailor-made equipment.

Our Sales Engineers are keeping in constant touch with conditions and changes. Our Research Department is experimenting with new methods and applications. The entire Engineering and Technical staff is available to help solve immediate problems.

Active and progressive research, development, manufacture and service have made Hanson-Van Winkle-Munning the "Plating and Finishing Headquarters"—the leaders in new developments of equipment and methods since 1870.

HANSON-VAN WINKLE-MUNNING CO.
MATAWAN, NEW JERSEY
PLANTS: . . Matawan, New Jersey . . Anderson, Indiana . . Bridgeport, Connecticut
SALES OFFICES: Anderson · Bridgeport · Chicago · Cleveland · Dayton · Detroit · Elkhart · Matawan
Milwaukee · New Haven · New York · Philadelphia · Pittsburgh · Springfield (Mass.) · Syracuse

2962

plating solutions and techniques, still there are many operators who experience difficulty in securing the grade of finish which they desire. There are, of course, many contributing causes leading to this situation, but it probably is not exaggeration to state that poor cleaning heads the list, and it can be argued quite soundly that in many plating rooms zinc and tin have received the least attention.

In many places and for many years the cleaning for these metals has largely been accomplished in the plating process itself rather than in the cleaners. This condition occurs, no doubt, because it is possible to neglect cleaning altogether and still get some kind of deposit. This process of cleaning is made possible by the high caustic, high temperature and high cyanide content of these solutions, a fortunate combination for a careless plater.

Naturally the thickness of plate varies widely under the contamination of surface due to improper or inadequate cleaning, and the color will range all the way from grey to black. This condition is especially serious now, for the shortage of metal is causing platers to limit the thickness of plate to the absolute minimum of acceptability, the only apparent requisite being complete coverage.

So it ought not to be necessary to point out that now if never before it is important to do a better job of cleaning in zinc and tin. Gone are the days when these processes could be ignored like an unwanted stepchild, with their tanks in the dark corner behind the door. Now it is necessary to turn out bright plate and be economical in the bargain, so that a surface can be secured that has all its recesses covered and has a decorative effect as well.

Almost for the first time in the history of this industry, the cleaning cycle in tin and zinc plating becomes a matter of great importance. It has been examined with a critical eye and in most plants has been discovered to be quaintly inadequate to say the least.

The remedy for the situation was quickly recognized, and those who had a surplus of direct current amperes on tap merely shifted to one of the more modern reverse current cleaners. But many made the discovery that they needed more amperes at a time when it was extremely difficult to secure additional generative capacity within the time remaining. To these the presence of standardized rectifiers proved a Godsend, for the standardized units were in stock and could be readily applied without upsetting heavy loads of bus bar or other plant layout.

It is immensely gratifying to observe that when these simple changes and additions were made, without the slightest variation in the composition of the plating bath, results have in many instances changed from a mottled color with poor plate distribution to a bright color with a uniform deposit.

But the most valuable by-product of the change is that with even zinc and tin scarce, there is considerable saving in metal. Most plating is being done today on a basis of minimum allowable thickness, and if we can secure satisfactory plate distribution, it will be possible to make a thinner average coating suffice.

Suppose there should be a restriction of average plate thickness imposed by the government in the interests of economy. When this time arrives, the plating industry will be caught between two limits, namely, a restricted average thickness and a minimum allowable thickness. When this day dawns, the platers of this country will be heavily concerned with their tolerances in zinc and tin plating, whereupon recourse will be

PREP-WASH

A New Arrival

IN THE "PREP" FAMILY

Introducing

A NEW CLEANING METHOD

●

Other "PREP" Products

METALPREP
PREP-RITE
GALVA-PREP

Prep-Wash, the new addition to the Prep line of metal cleaning products, is a radical departure from previous cleaning methods; it is more effective than alkali cleaning and much safer. The same thing holds true in comparing Prep-Wash with emulsion types of cleaners. It is also more effective than solvent cleaning and much cheaper. Present alkali washing machine equipment can be utilized for the Prep-Wash process in preparing metal surfaces for paint.

The Prep-Wash process, at a minimum cost, does a thorough job of mechanically removing oils and greases, imparts a rust-resisting film to the metal and produces a microscopically etched surface for better paint bond.

Available as a substitute for critical materials.

NEILSON CHEMICAL CO.

6564 BENSON ST., DETROIT, MICH.

(Also Los Angeles and Windsor, Ont.)

had widely to the modern cleaners and the modern rectifiers that go with them as appropriately as ham goes with eggs.

Oakite News Service Vol. XXV, Nos. 11-12. In view of defense demands for greatly accelerated output of munitions, a five-page illustrated feature article appearing in Vol. XXV, Nos. 11-12 edition of Oakite News Service, house organ of Oakite Products, Inc., 20 Thames St., New York, N. Y., is of timely interest since it describes how new cleaning materials and methods are successfully helping speed up shell production.

The article gives considerable data on cleaning high explosive, anti-aircraft and Howitzer shells ranging in size from 75 to 155 mm. before inspection and painting either by mechanical washing machine or tank cleaning methods. In this connection, the characteristics and qualities required of materials used in this work are also reviewed.

Among the important, closely related factors discussed which influence production quality and output of shells, are the effect of drawing lubricants and cutting fluids on subsequent cleaning operations, the simplification of cleaning through new production techniques, and the prevention of rust formation on steel shells after cleaning.

Superintendents and foremen of plating departments and contract finishing shops will also be interested in another article appearing in this edition of Oakite News Service which describes and illustrates the plating of aluminum, brass, and Invar metal radio condenser parts to micrometer tolerances. Copy of Oakite News Service free upon request.

Hygrade Miralumes for continuous row industrial lighting is the subject of a four-page folder released by the Miralume Division, Hygrade Sylvania Corp., Ipswich, Mass. The folder includes illustrated, descriptive, and tabular information on the 100-watt Miralume F-104, 150-watt Miralume 154, 200-watt Miralume F-208, and 300-watt Miralume F-308. Copy free upon request.

Defense Savings Bonds are now available at more than 16,000 post offices and 9,000 banks throughout the United States.

"IRCO-IZING" Process using IRCO ZINC COAT

(Fully meets government rustproofing specifications.)

5 Minute Dip for paint base—increases life of paint three to five times.

30 Minute Dip, Stain, and Oil for final finish to replace Zinc, Cadmium, Tin and other strategic metals.

Here is your opportunity to aid defense and increase your profits, by adopting a material which is immediately available.

Write for Literature.

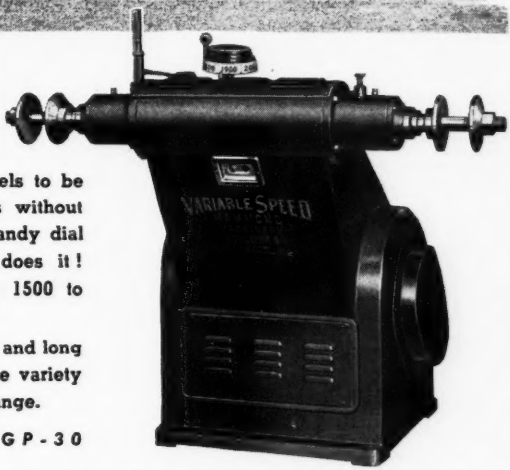
IRCO PRODUCTS FOREVER RUST FREE THE WORLD OVER

INTERNATIONAL RUSTPROOF CORP.

Cleveland, Ohio

How to Polish and Buff BETTER IN '42

HAMMOND "VRO" VARIABLE SPEED POLISHING LATHE



The "VRO" permits buffing-wheels to be used right down to the flanges without losing peripheral speed — the handy dial right in front of the operator does it! Instant changes anywhere from 1500 to 3000 RPM.

The "VRO", built for hard service and long life, is designed to handle a wide variety of work — other than average range.

WRITE FOR BULLETIN GP-30

HAMMOND "400" BELT SURFACER

This "Dri-N-Wet" Abrasive machine handles almost any material you can name: plastics, lead, rubber, bone, wood, ceramics and metal of all kinds. Operates in vertical or horizontal position. Easily converted into vertical Wet-Machine by addition of simple pan and hood. See our complete line of Abrasive Belt Surfacers in floor or bench models.

WRITE FOR LATEST BULLETIN GP-7

Hammond Machinery Builders INC.

1622 DOUGLAS AVENUE • KALAMAZOO • MICHIGAN

EASTERN BRANCH - 71 WEST 23RD STREET, NEW YORK CITY

Helping the Housewife Take Pride in Her Kitchen Range

By E. A. LINDEMANN,

President and General Manager,
A. J. Lindemann & Hoverson Co., Milwaukee.

WHEN one thinks of the tremendous progress of our great nation during the last half century, it is generally in terms of huge machinery, lofty skyscrapers, massive concrete dams and giant hydro-electric generators, not to mention streamlined automobiles and powerful trucks and tractors. Yet, just as great strides have been made in one of the more commonplace essentials of daily life—the kitchen range. It is indeed a far cry from the old black cast iron stove with its ornate carvings in the Victorian style (which the youth of today has probably never seen except as a museum exhibit of what his grandmother used), to the one-piece welded ranges, porcelain enameled inside and out, giving a new beauty in exterior appearance, smooth, gleaming surfaces with rounded corners, free from those ugly, dirt-collecting joints and crevices, which were the bane of the housewife of an earlier day.

Smart arrangement of modern kitchen equipment is possible with the beautifully styled kitchen range shown here.

Among the pioneers in the development and manufacture of domestic cooking appliances, is the A. J. Lindemann & Hoverson Company, established more than a half century ago, and now operating one of the large

industrial plants in Milwaukee, Wis., the porcelain enameling department being one of its many interesting features.

Here the work passes back and forth as it travels along dangling along on an overhead mono-rail, being raised and lowered successively into the different tanks. First they are lowered into the electrolytic cleaning solution, which is followed by a hot water rinse; next comes the

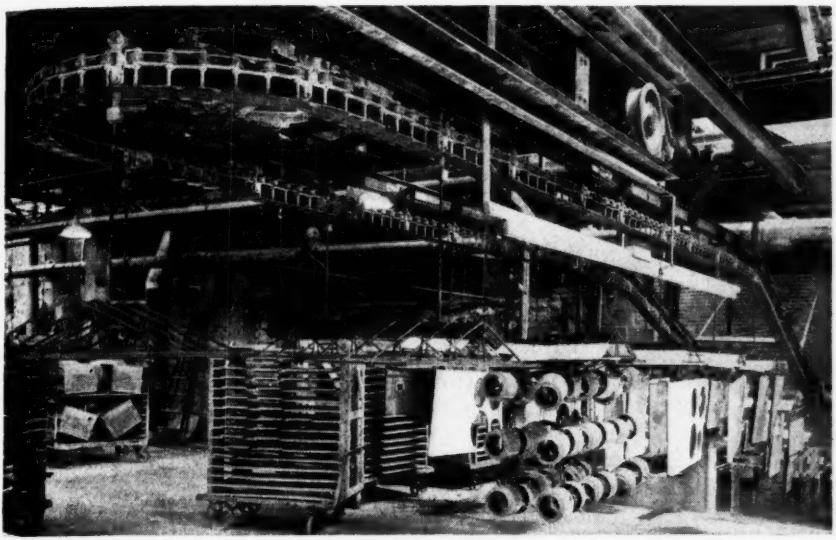


Fig. 1—Range panels and other parts approaching the unloading zone after having passed through porcelain enameling furnace.

from an overhead trolley conveyor. Large pieces hang suspended from two of the conveyor hooks, the smaller pieces riding on single hooks; while still smaller parts, such as trays, drip-pans, door panels, etc., are placed on racks, some of which are constructed like sets of shelves and hang between two of the conveyor hooks.

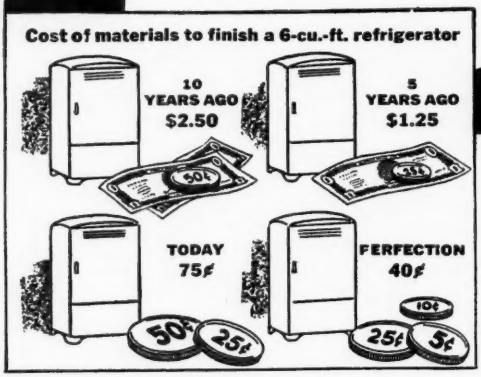
After passing through the different stages in the manufacturing process, cutting, stamping, forming, bending, and welding, the various pieces arrive at the cleaning department where all work that is to be given a vitreous enamel finish receive an electrolytic treatment. The work is placed in large steel baskets that are swung sulphuric acid pickle and another hot water rinse; then follows the nickel dip and another hot water rinse; and finally the alkaline neutralizer. After this they are loaded onto trucks and moved into the enameling section. Here all ground coats are applied by the night force while the white or finish coats are applied in the day time.

The ground coat is applied to all work, the small pieces being dipped, while the larger ones are sprayed at any of the several spray booths spotted along the conveyor line, pressure tanks of 30-gal. and 60-gal. capacities being used. After work has been either dipped or sprayed, it is passed through a drying oven, when

HINTS ON FINISHING ECONOMIES

1. THIS COSTS $10.00 AN HOUR FOR THE MATERIALS ALONE

▶ If a modern spray gun is opened wide for an hour, it will spray out about $10.00 worth of materials (based on synthetic paint @ $2.25-$2.50 per gal.). With other type materials this cost might run up as high as $25.00 per hour.



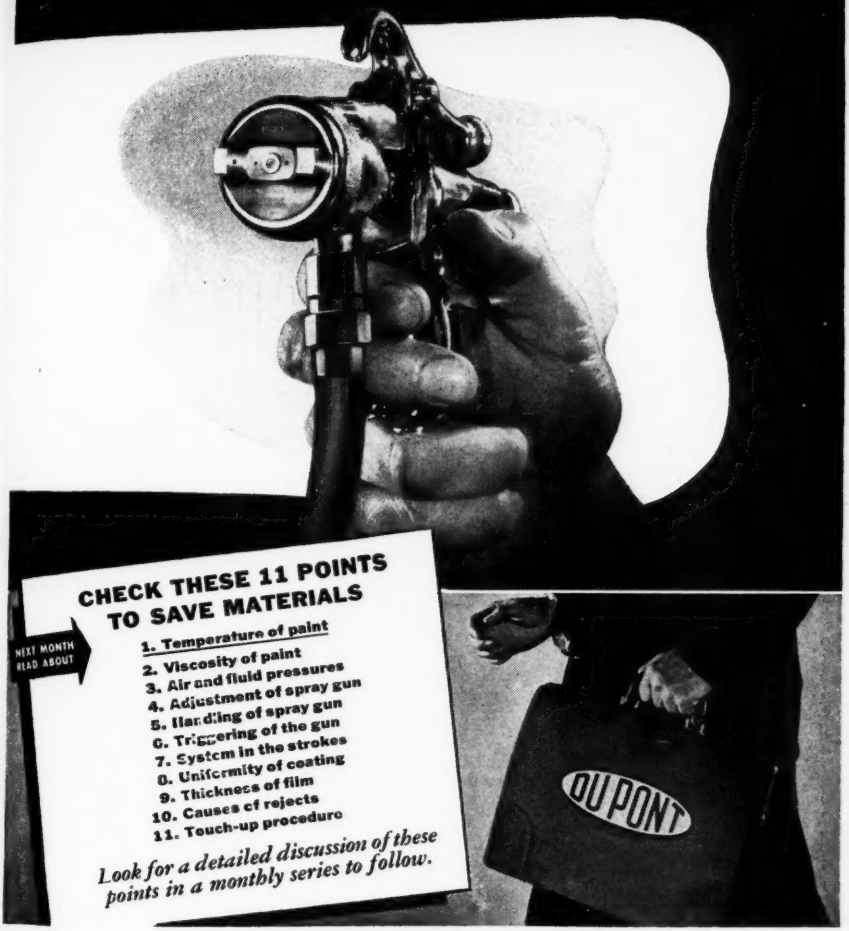
2. HOW ONE INDUSTRY HAS SAVED ON MATERIALS

▶ Some of these economies came from improved formulas and lower prices for materials. But the biggest savings have come through better painting technique. Of course, 100% efficiency is just a goal to shoot for. But regardless of what you finish . . . you, too, can save money by improving technique.

3. NOW'S THE TIME TO CONSERVE MATERIALS

▶ When all industry faces shortages of materials, conservation means more than money-saving alone. What's more, improved techniques become doubly important when they also conserve man power. And improved finishing technique will insure continuous savings later on, too.

...from the Du Pont man


CHECK THESE 11 POINTS
TO SAVE MATERIALS
1. Temperature of paint
2. Viscosity of paint
3. Air and fluid pressures
4. Adjustment of spray gun
5. Handling of spray gun
6. Triggering of the gun
7. System in the strokes
8. Uniformity of coating
9. Thickness of film
10. Causes of rejects
11. Touch-up procedure
NEXT MONTH READ ABOUT
Look for a detailed discussion of these points in a monthly series to follow.
DU PONT

THE Du Pont man can show you how to control these factors . . . can aid you in conserving finishing materials and lowering painting costs. And remember —he's backed by a vast chemical organization with the finest of facilities for developing, making and applying better industrial finishes.

When the Du Pont Man calls on you —call on him for help. E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Wilmington, Delaware.

it is ready to be hung on the overhead trolley conveyor to start its journey through the electric furnace. This furnace is so arranged that the work enters a pre-heating section before passing directly into the firing chamber. Then, on leaving the firing chamber, it comes back and again passes through the pre-heating section, which at this time serves as a partial cooling zone. Passage through the pre-heating section causes a gradual expansion, the pores of the metal being opened to permit a perfect fusion of the porcelain enamel mixture with the metallic base, while on the outward trip, with the pre-heating section serving as a cooling zone, there is a gradual contraction of the metal back to its normal state. The actual degree of heat at the burning point ranges from 1550 to 1600 deg. F. for the ground coat, and from 1520 to 1540 deg. F. for the white or finish coat.

The application of the ground coat and the first firing being completed, a rigid inspection is given each piece, and all work which is to be given a white finish is again routed past either the dipping stations or spray booths, where the initial white coat is applied, after which the pieces pass through a drying oven and are then sent through the pre-heating chamber, firing furnace, and back through the partly heated cooling zone. The process is practically a repetition of that carried out for the ground coat, except that the temperature in the furnace is somewhat lower, and the flanges on all white coat work are brushed as the pieces come from the dryer and before be-

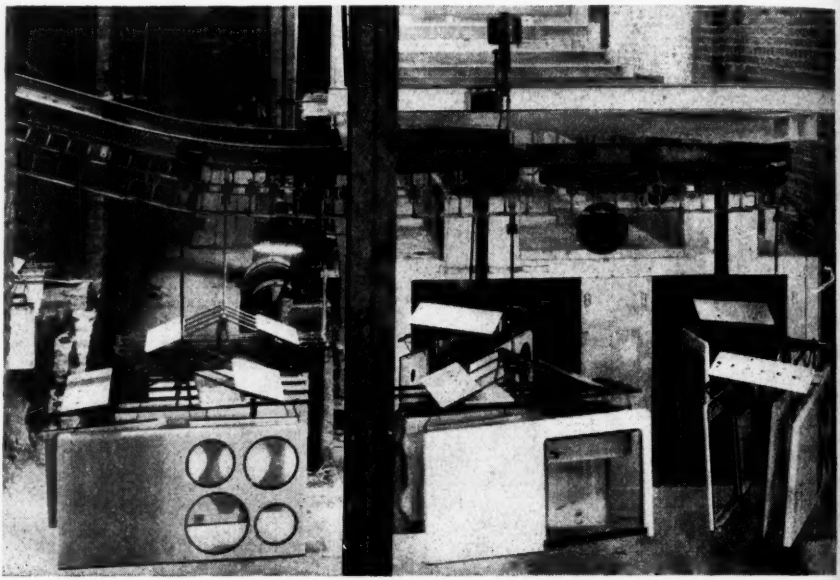
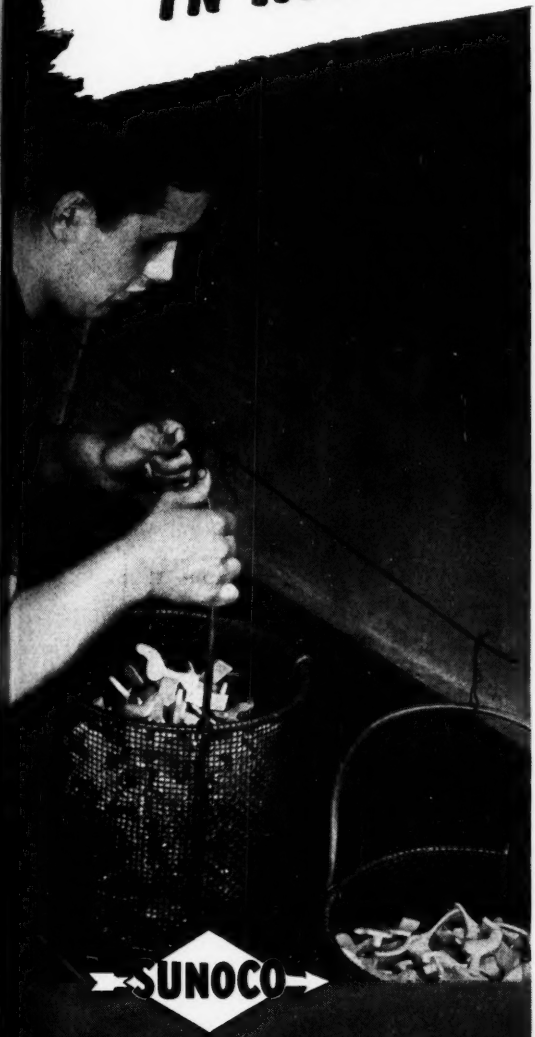


Fig. 2—Work moving into and out of heat-sealed, U-type, 350 kw. 220-v. 3-phase, continuous porcelain enameling furnace. Parts are entering the pre-heating chamber on the left and leaving the cooling zone through the opening on the right.

NO SHORTAGE IN METAL CLEANERS



with

SUNOCO SPIRITS

Help solve your problems of priorities on cleaning mediums with this modern, highly-efficient solvent. Sunoco Spirits cleans fast . . . cleans thoroughly . . . is always ready for instant use . . . requires no mixing or heating . . . and meets fire underwriters requirements.

Throughout the metal working field Sunoco Spirits is being used more and more to cut grease . . . cut costs . . . cut time . . . and help finishing departments maintain a higher P-Q (Production Quota). For complete information, write or wire your local Sun office, or —

SUN OIL COMPANY
Philadelphia, Pa.

HELPING INDUSTRY HELP AMERICA

ing dispatched to the firing furnace. The second, or finished white coat, is the same as that of the first. As the gleaming white work comes to the cooling chamber, it is taken from the conveyor hooks and placed on a fabric conveyor belt that carries it along to an inspector for a final inspection before it is sent into storage to await removal to the assembly line.

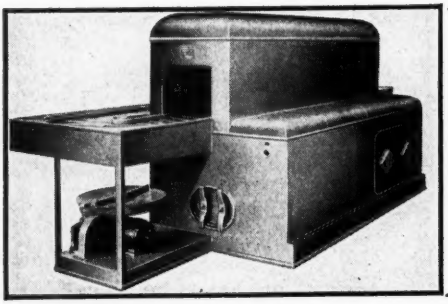
In a nearby smelting and milling room many of the porcelain enamels are made, the batches being carefully analyzed and weighed before feeding into the large drum mixers. Two smelters are in operation in the smelting section—one for white finish coatings, and one for the ground coat. After the various chemical ingredients have been reduced to a molten mass of glass, it is drawn off into receptacles partly filled with cold water, causing the substance to crumble into fragments known as frit. This frit, or glass is then placed in porcelain lined grinding mills and ground with water, by means of porcelain balls, to a creamy consistency. With the addition of the proper color ingredients the porcelain enamel is ready to be pourned into pressure tanks or dipping vats.

Some products, such as water heater parts and certain parts of oil stoves receive a synthetic enamel finish. This work is carried on in a separate department, the application being made by both dipping and spraying. Here the parts are first thoroughly washed with an organic solvent and dried before passing to the dipping or spraying stations, some parts receiving one coat and others two. Small pieces, after dipping or spraying, are placed in wheel racks which, when full, are pushed into gas-fired ovens for drying and baking. Larger parts are carried through another oven on a chain conveyor.

An interesting operation is the finishing of the two and three burner oil stoves which receive a single dipped coat of white synthetic enamel. These stoves are in continuous production, and after receiving their dipping they travel on a chain conveyor through a gas-fired oven with a temperature of 300 deg. F. As the pieces issue from the other end of the long oven they are at once transferred to the assembly line, where, as they pass along on a moving belt, they are assembled, tested, wrapped, and placed in a carton, which is then closed, sealed, and made ready for shipment.

Defense Savings Bonds are now available at more than 16,000 post offices and 9,000 banks throughout the United States.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.



HYDRO-FLOW
Industrial Washing Machines

Streamlined design. Hidden motors, pumps and pipes are easily assembled. Piping and nozzles located to insure thorough cleansing of all surfaces. Rugged and efficient pressure pump. Corrosion resistant spray nozzles—from mist to open stream. Monorail, Belt or Gravity type conveyors designed to carry any shape or size material. Variable speeds on conveyor drive synchronize production.

International Conveyor & Washer Corp.
Write for circular.
640 E. FORT ST. DETROIT, MICH.

Take a Leaflet

FROM DU PONT EXPERIENCE

The supply of some metals can be greatly conserved by efficient use of electroplated coatings of these metals on steel in place of the solid metal. Practical application is another important factor. These requirements can be met with the wide variety of du Pont chemicals and processes. Technical bulletins with a wealth of useful information are available from du Pont. Send for them today, using the coupon below. Or write us, outlining your special problem. Our Technical Service staff will help you to find the answer.

DU PONT

REG. U. S. PAT. OFF.

ELECTROPLATING DIVISION

E. I. DU PONT DE NEMOURS & CO. (INC.)

WILMINGTON, DELAWARE

GENTLEMEN: I am interested in plating.....
Please send the books checked below.

- ☐ Electroplating Chemicals, Processes, Materials
- ☐ Electrodeposition of Gold and Silver
- ☐ High Speed Copper Electroplating Process
- ☐ Electrotinning
- ☐ Operating Instructions for "Zin-O-Lyte", the Zinc Molybdenum Process for Brilliant Zinc
- ☐ Current Density Range Characteristics - Their Determination and Application
- ☐ High Speed Brass Electroplating Process
- ☐ The Removal of Sodium Carbonate from Cyanide Plating Solutions
- ☐ Hull and Strausser Tests for Zinc, Cadmium, Tin and Copper
- ☐ "Moly-Black" for Production of Deep-Black, High-Luster Deposits
- ☐ "Cadalyte" - the Complete Salt for Cadmium Plating
- ☐ "Cadalyte" Bright Dip for Improved Cadmium Plated Surfaces

Name..... *Title*.....

Company..... *Address*.....

New Plant Produces Clean Clay for Porcelain Enameling

CLAY used for porcelain enameling, in its natural state, contains a certain percentage of contaminating foreign materials including coarse sand, mica, pyrites, and organic or vegetable matter. These foreign materials, even when present in small amounts, can be extremely harmful to enamel performance and the problem of producing clean clays has developed several methods of refining clay before it is sent to the porcelain enameling plant.

One of these, known as "air floating," derives its name from the fact that dried lump clay, after pulverization in a suitable machine, is carried in an air stream to a settling chamber permitting the powdered clay to be bagged. The movement of the air stream, during pulverization, transports the fine clay particles while the larger particles remain behind until they have been reduced to a size that enables the air current to carry them away.

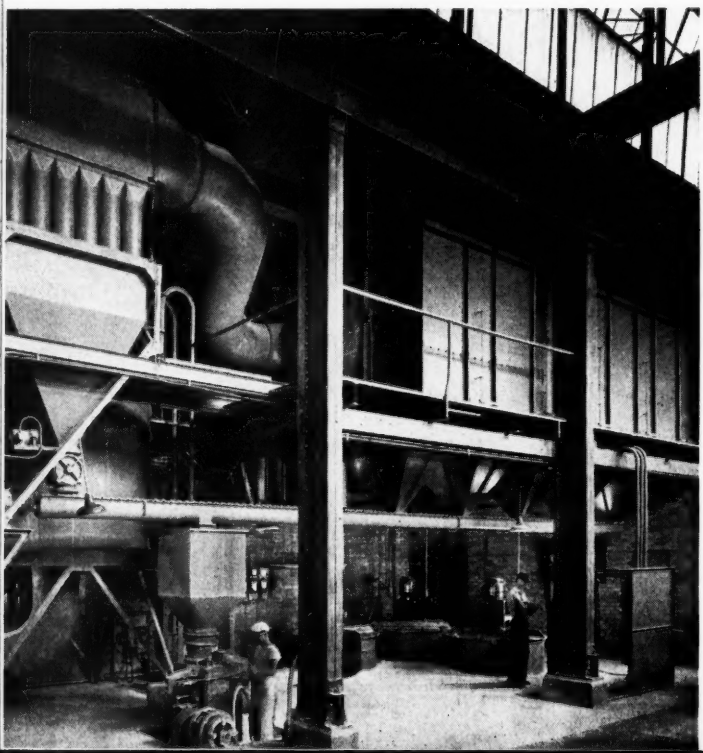


Fig. 1—General view of the new clay refining plant at Chicago Vitreous Enamel Company, designed for the production of uniform "Hydro-Cleaned" clay.

A layout plan of the new Chicago Vitreous Enamel Company's plant designed for the production of clean clays for porcelain enameling.

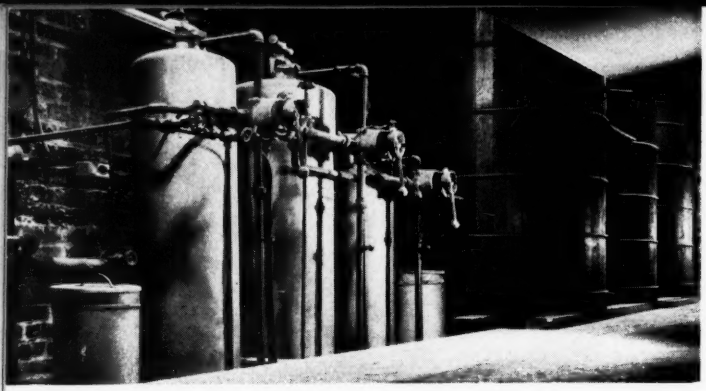


Fig. 2 — Storage and distilling equipment for producing the synthetically distilled water employed in the process to insure absolute purity of water in the blunging operation.

This process, while producing a more easily handled material, does not necessarily remove all foreign material, but it does tend to reduce the size of the contaminating particles and disperse them more uniformly through the powdered clay. It should be emphasized that reduction of size of contaminating particles does not constitute removal and that defects showing up in the later enameling process are merely reduced in size.

Another relatively new method of enamel clay processing, believed to have been originally designed for the pulverization of insecticides, depends upon the rapid impact of clay upon clay, causing the clay, which is a readily friable material, to break up

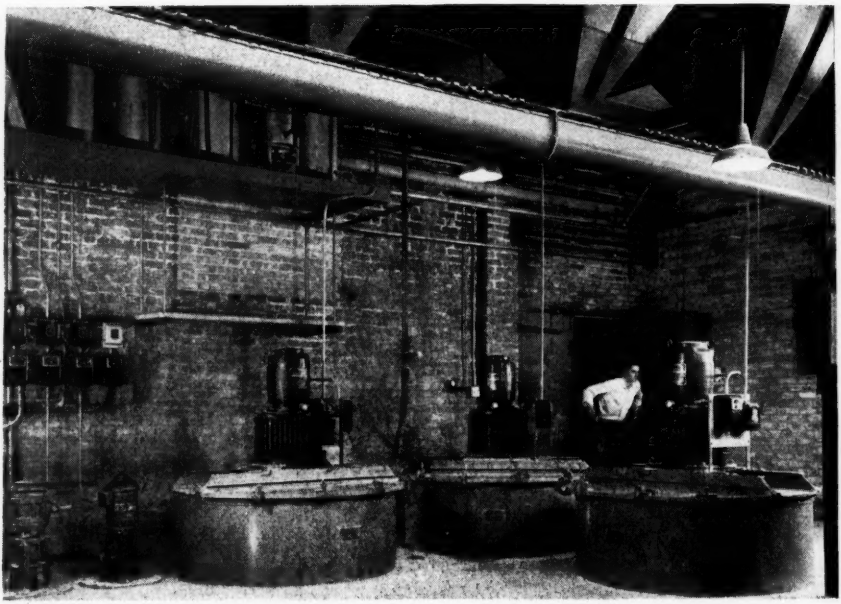


Fig. 3—The blunging equipment shown here is used in reducing dry lump clay to a homogeneous slip. It is the only method by which the clay particles can be reduced to their ultimate state of subdivision without affecting the fineness of contaminating foreign materials.

★CONSERVING METALLIC FINISHES?

★ *leading authorities have tested and recommend . . .*

- BEARINGS
- GEARS
- GUNS
- AIRCRAFT PARTS
- LIGHT FIXTURES
- BEARING RACES
- TOOLS
- STAMPINGS
- GAUGES
- INSTRUMENTS
- MOTORS
- PROPELLORS
- SPARK PLUGS
- AUTOMOTIVE PARTS
- CHAINS
- SPRINGS
- THOUSANDS OF OTHER STEEL PARTS

Phytanium Blended

PENTRATE

(PATENTED)

The Patented BLACK FINISH for STEEL

This fast, efficient penetrating black finishing process fits quickly into any production line—economically. • The durable, uniform finish is rust-resistant, reduces friction on bearings, and helps to increase the life of cutting tools. Positively NO CHANGE IN SIZE OF PART TREATED. The treatment actually penetrates into the steel. • Equipment is not expensive and no skilled operators are necessary—this process can be automatically controlled. • Pentrate materials are shipped directly from stock—no priorities necessary.

Send for free 18-page booklet. • Send samples of your product for pentrate demonstration.

Many government contracts specify pentrate on strategic defense contracts.

HEATBATH CORPORATION

SPRINGFIELD, MASSACHUSETTS

into small particles. Employing centrifugal force, this process eliminates some of the heavier particles. The relatively hard materials, including sand and pyrites, do not reduce to the same fineness as the more friable clay in this process but it is inevitable that some portion of these materials will become finely divided and be carried off with the clay.

These methods of clay preparation, introduced during the past few years, have done much to improve the quality of enamel ware as well as insure more efficient operation in the enameling plant. Both of these methods depend upon the dry pulverization of the crude lump clay and because of this cannot be depended upon to remove the greatest possible percentage of both magnetic and organic contaminating particles. While it is true some of the particles are removed by "air floating" or centrifugal separation, some portion remains in the material in a fine state of subdivision. These remaining particles are potential sources of difficulty in the enameling operations.

Because it was felt that an even greater percentage of contaminating material could be removed from crude clay, the Chicago Vitreous Enamel Product Company, Cicero, Ill., has developed, over a period of time, an entirely new method of clay preparation that does not depend upon dry grinding of the clay prior to bagging. The process is essentially a clay washing or blunging operation which avoids any reduction in particle size of the contaminating materials. This is followed by screening, magnetic separation, drying and bagging, resulting in a dry powdered clay from which foreign material has been removed without changing the salt content of the clay so essential to set.

In the process, lump clay as received from the mine, is thoroughly blunged, in synthetically purified water to a smooth slip of standard water content. Special water treating apparatus is part of the clay processing plant to insure absolute purity of the water used in blunging. Basically, the water purifying apparatus (supplied by the Illinois Water Treatment Co., Rockford, Ill.), consists of two tanks, and is the same equipment now being used in the mill rooms of a number of enameling plants. In the first of the two tanks practically all of the hardness producing salts are

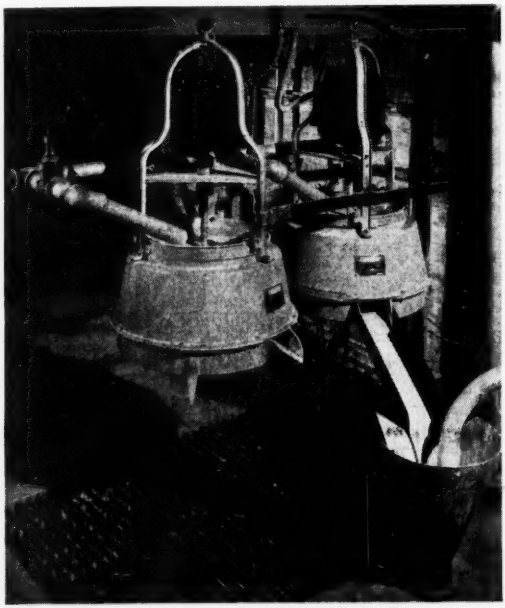
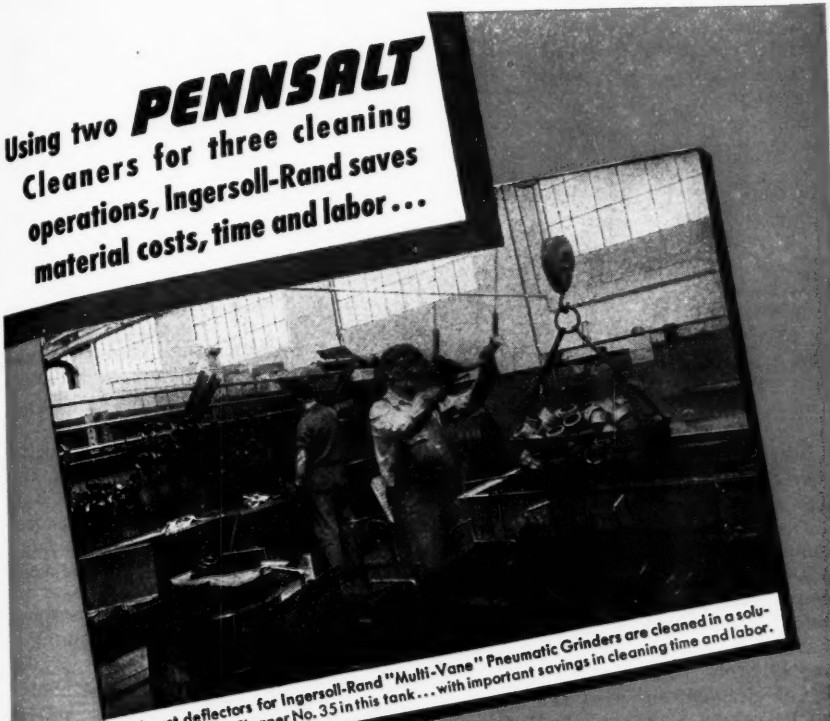


Fig. 4 — The Rotospray equipment shown here handles the removal of vegetable matter, pyrites, mica, and other materials which are not finely subdivided, as in the case of the clay, by the blunging operation.

Using two PENNSALT Cleaners for three cleaning operations, Ingersoll-Rand saves material costs, time and labor...



Exhaust deflectors for Ingersoll-Rand "Multi-Vane" Pneumatic Grinders are cleaned in a solution of Pennsalt Cleaner No. 35 in this tank... with important savings in cleaning time and labor.

Ingersoll-Rand Company, famous manufacturer of pneumatic tools, compressors and other equipment, has achieved important savings in three cleaning operations by using two Pennsalt Cleaners.

1. For still tank cleaning of many metal parts prior to Parkerizing, Ingersoll-Rand uses Pennsalt Cleaner No. 35, saving time and labor.

2. Similar savings have resulted from Ingersoll-Rand's use of Pennsalt Cleaner No. 35 for still tank cleaning of metal parts after hardening.

3. In spray washers which clean iron and steel castings, forgings and bars, bronze, brass, zinc and aluminum parts... about 10,000 different metal parts... Ingersoll-Rand uses Pennsalt Cleaner No. 32 with great success. This cleaner efficiently removes machine oil and polishing compounds from the metal parts, and also provides rust protection between processing steps. By changing to Pennsalt Cleaner No. 32, Ingersoll-Rand saves an estimated 37% in the cost of cleaning materials ...*and* gets better results!

If you have a metal cleaning problem there is a Pennsalt Cleaner which will meet your specific needs... and probably save *you* valuable time, labor and cost. Write today to our Pennsalt Cleaner Division for information.

PENNSYLVANIA SALT MANUFACTURING COMPANY
Chemicals
1000 WIDENER BUILDING, PHILADELPHIA
New York • Chicago • St. Louis • Pittsburgh • Wyandotte • Tacoma

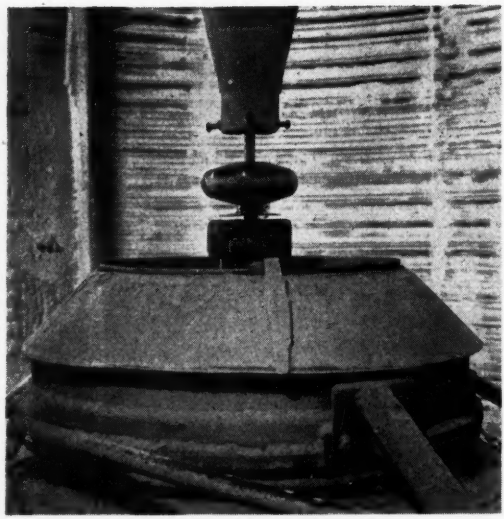


Fig. 5 — Interior view of the dessicating chamber showing the revolving high speed atomizing head which throws off the clay slip in the form of a fine mist.

removed with the subsequent release of hydrogen ions. The hydrogen ions (acid radical) are then combined with hydroxol ions (basic ions) to form a practically neutral water in the second tank. This process removes all but colloidal silicates and the unit can be set to give a controlled grain hardness.

The blunging equipment produces no grinding action and due to the physical property of the clay, namely slaking ability, only the clay is broken down into its finest subdivision. In any grinding there is a possibility of contamination from wear that is avoided by the blunging process. This reaction of clay toward water has been described by various investigators, who are in agreement that the mechanics of slaking is due to the separation of the clay molecule caused by swelling when water enters in between the layers of clay particles.

Actual laboratory tests indicate that if clay is completely blunged, each clay particle is in a fine state of subdivision, while foreign materials, such as silica, pyrites, lignite, wood, and mica (common to clays) are not reduced in size and allow for separation by mechanical means. Blunging also has the advantage of disseminating the clay salts thoroughly to provide a more uniform material.

When the blunging operation has been completed, the clay slip passes through a coarse mesh screen into underground storage tanks, from which it is pumped through a magnetic separator for the removal of iron particles. Coming from the separator, the slip then passes through a centrifugal screening device which eliminates the contaminating material such as pyrites, sticks, leaves, and so on, common to all crude clay.

After cleaning in this manner, it is necessary to remove the water in the slip, so that the clay can be packaged and shipped in the most convenient form for use. The use of purified water in the blunging operation precluded the possibility of the addition of soluble salts and therefore would not change the soluble ions already present in the clay. If the water were to be removed from the slip by settling or filter pressing, the salt content of the clay would be changed by the process. In this new method, the water is removed by evaporation and since the water leaves the clay in the form of vapor, all salts are left behind with the clay.

To accomplish this, the clay slip under constant pressure is introduced into a chamber known as a dessi-

ENLISTED FOR DEFENSE

DU-LITE DU-LITE

STEEL COLORING PROCESS

DU-LITE was the widely accepted standard black finish for steel before the emergency.

More than two years ago DU-LITE was used on early defense items and now is daily finishing thousands of defense parts.

DU-LITE is approvd by the U. S. Government and Allies for many parts.

Prime contractors use DU-LITE and specify this finish from their subcontractors.

DU-LITE is used extensively as a substitute for plating, releasing plating materials for use where urgently needed.

The DU-LITE CHEMICAL CORPORATION is organized to furnish equipment, material and service *promptly*.

Call our nearest representative or write direct for complete information on the DU-LITE combination — DU-LITE "290" SALTS, DU-LITE "29" CLEANER and PROCTOIL.

Submit samples for processing and let us give you the answer to your steel finishing problem.

DU-LITE CHEMICAL CORP.

MIDDLETOWN • CONNECTICUT

LIST OF REPRESENTATIVES

EASTERN EQUIPMENT CO.
381 4th Avenue
New York, N. Y.

•

CHAS. C. FREE
604 Chamber of Com. Bldg.
Pittsburgh, Pa.

•

KEYSTONE CHROMIUM CORP.
1095 Niagara Street
Buffalo, N. Y.

•

WILLIAM C. BRYAN
2824 No. Sheridan Road
Chicago, Ill.

•

SPRADLIN MFG. & SALES CO.
4461 West Jefferson Ave.
Detroit, Mich.

•

GEORGE E. GAMBLE
11447 Euclid Avenue
Cleveland, Ohio

•

LASALCO INC.
2822-38 La Salle Street
St. Louis, Mo.

•

J. L. LAKEMAN
922 So. Bronson Street
Los Angeles, Calif.

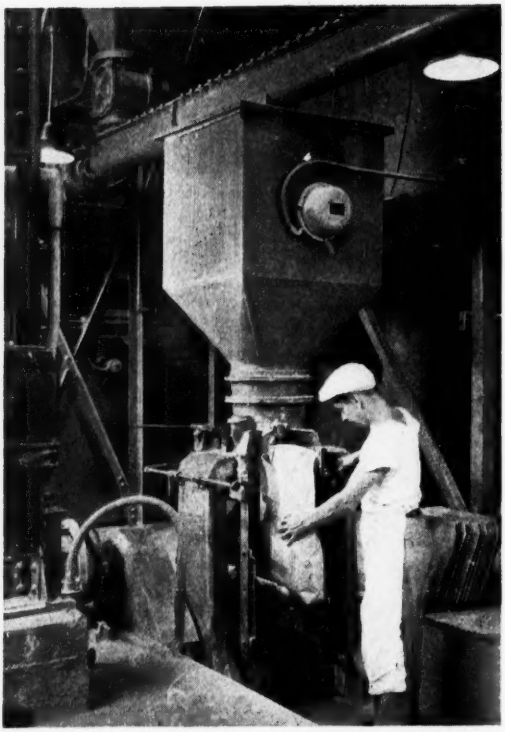


Fig. 6—The valve bagging operation completes the clay refining without any outside air having been in contact with the clay from the time it starts in the equipment until it is finally bagged for use.

cator. The slip feeds into a rapidly rotating head throwing a constant fine mist and its rate of flow is regulated by an automatically controlled valve, which admits only as much slip as can be evaporated by the filtered and heated air passing through the dessicator. The temperature of both incoming and outgoing air is automatically controlled at the entrance and exit of the drying chamber. The hot, dry air coming in contact with the clay mist, instantly changes the water in the clay to a water vapor which is simultaneously absorbed by the air.

The clay is transported along an air stream containing the water vapor and because the amount of water in the air is less than it is able to carry at the temperature used, further drying takes place, producing a dry powder with a water content of less than one per cent. At no time are the dried clay particles subjected to a temperature in excess of 250 deg. F., which is far below the dehydration temperature of the clay molecule. The clay being dried while in a fine state of subdivision, thus avoiding packing, has a favorable influence upon the suspension qualities of the finished product.

From the dessicator the clay particles are passed through a multiclone separator which serves to remove the heaviest clay particles, the fines continuing on to a secondary collector. This second unit is essentially a dust collector fitted with fine mesh bag collectors. In this device the bags are shaken automatically and the powdered clay collected from both units is continuously transported by a right and left hand conveyor to the bagging hopper. The air pressure within the system is controlled by automatic valves operated in sequence with the discharging cycle of the multiclone and bag collectors. Each section of the bag collector is under separate manometer control and its sequence of operation and discharge is actuated by a cycling timer, to provide correct frequency of separation and discharge. The valve bagging employed completes the cycle of clay refining without the product

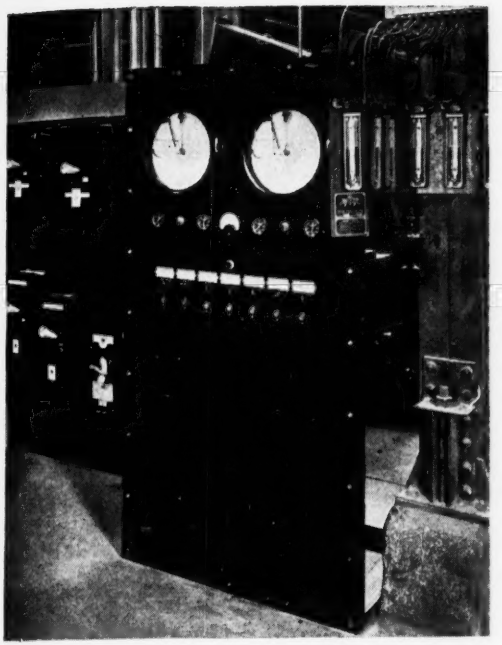
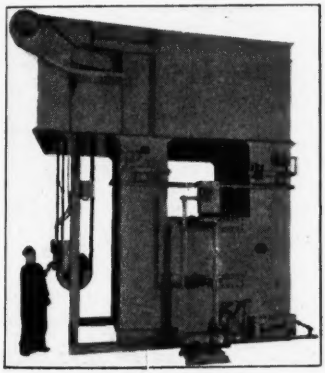


Fig. 7—Through the use of this control panel, provision has been made to check each process step for the production of a uniform and consistent product.

coming in contact with unfiltered air during the entire process.

The process of blunging and screening clay from the removal of objectionable contaminating materials has long been in use in the pottery industry. To it has been added magnetic separation and a method of spray-drying the slip instead of filter pressing. This new method insures no change in soluble salt content and produces a dry powdered material whose working properties for porcelain

Bidding on a Contract?



METAL WASHERS AND DEGREASING MACHINES

FOR LOWEST UNIT CLEANING COSTS

***Wire* BLAKESLEE**

For metal cleaning of any kind, from all size shells to heavy armor plate, as cleaned in the machine illustrated. From our past experience and the many machines operating under our Defense Program, we can give you the best engineering for your job.

Wire us the details for urgent proposals.

G. S. BLAKESLEE & CO.

Cicero Station

NEW YORK CHICAGO TORONTO, ONT.

enamel are not only unimpaired, but are actually enhanced by the cleaning treatment.

Obviously, such a process of clay treatment requires close attention to the details of all operations if the full benefits possible are to be realized. Provision for rigid control of every step has been made to insure a uniform and consistent product.

Simple Methods of Analyzing Plating Solution. The sixth edition of a 48-page booklet giving in detail simple and practical methods of analyzing plating solutions has been published by the Hanson-Van Winkle-Munning Co., Matawan, N. J., manufacturer of electroplating equipment and supplies. This work has now been in circulation since 1930 and has become one of the standard textbooks in its field. The methods recommended are simple and highly practical in character, and can be applied by men without extensive chemical training. A number of new features appear in this edition which are noted below.

The contents of the book include descriptions of the principles involved in analysis, the use of apparatus, the method of sampling a plating solution and step-by-step methods for the complete analysis of the following solutions: Nickel, black nickel, silver, sulphate copper, cyanide copper, Rochelle copper, cyanide brass, cyanide gold, cyanide zinc, sulphate zinc, chromic acid, alkaline tin, cyanide cadmium, H-VW-M bright cobalt nickel, H-VW-M semi-bright nickel.

The book is thoroughly indexed, making it easy to find the particular analysis desired. Full lists are given of the necessary equipment and chemicals required for the analytical work. The book contains a number of valuable reference tables covering: Component parts in per cent by weight, of salts commonly used in electroplating; densities of commercial acids; electromotive series; sodium cyanide required to dissolve metal salts; acid and alkali actions on metals; electrochemical equivalents.

A new section is included, Electrochemical Data for the Important Metals, which gives the usual cathode efficiencies; average cathode current densities; ampere minutes per square foot to deposit 0.0001 in. at the usual efficiency; the time in minutes required to deposit 0.0001 in. at the average cathode current density and the usual cathode efficiency; all of this data for a number of the most important plating solutions. A detailed description is given, with examples, of methods of determining the thickness of deposits at various plating times and current densities. Another useful table gives the factors for the conversion of weights of metals into thickness and vice versa.

Copies of this book are obtainable on request from the Hanson-Van Winkle-Munning Co., Matawan, N. J. This company also places its laboratory at the full service of all electroplaters for instruction and consultation.

Fostoria Near Infra-red Manual. A 16-page manual on the Near Infra-red Process, covering applications in the industrial field, has just been published by The Fostoria Pressed Steel Corp., Fostoria, Ohio. This presentation is illustrated with pictures of various applications and equipment required in the operation of the process and describes in detail what radiant energy is and how it works. Copy free.

HARSHAW ANODES AND CHEMICALS

meet the highest standards of the plating industry . . . Anodes and chemicals for every kind of plating.

THE HARSHAW CHEMICAL CO.
Cleveland, Ohio and Principal Cities

Photo courtesy American Locomotive Co.

Vital to Railroad Transportation, Too

Alundum Abrasive for Polishing

NOT only in the production of countless airplane and automobile parts but also in the railroad industry Alundum Abrasive is vital in many finishing operations.

A fast cutting action in the coarser grain sizes for heavy duty polishing—exceptional finishing ability in the finer sizes for fussy jobs—Alundum Abrasive meets both requirements.

Special tests at the Norton electric furnace plant assure its hardness and toughness; special Norton crushing and screening processes assure its accurate shaping and sizing; special Norton surface treatments give it extra capillarity—extra "sticking" power on the wheel head.

NORTON COMPANY, WORCESTER, MASS.

G-134

NORTON ABRASIVES

Barrel Finishing of

Part Sixty in a Consecutive Series of Articles—Some Pertinent Suggestions and Acknowledgements in This, the Concluding Paper of the Series

By H. LEROY BEAVER
Barrel Finishing Consultant,
Lansdale, Pennsylvania

FOR this, the concluding paper of the series covering the Barrel Finishing of Metal Products, we had planned on an entirely different type of paper than that which we are now writing. That paper would have summarized in considerable detail a great many of the most important factors dealt with over a research period of upwards of thirty years. While we feel that this information would have been of great value to the American Manufacturer, we cannot overlook the fact that such information available here might also quite easily become available in other quarters where it would be just about everything but a help to us in pursuing our program for national defense.

Barrel finishing procedure can and should play a most important part in the defense effort in speeding up the production of necessary materials and in no other way can a process generally known as deburring be so quickly and economically accomplished, but perhaps its most important application right now would be in the field of substitution and conservation where it can go far in the conservation of strategic metals as well as to give completely practicable applications for the substitution of one metal for another or one material for another, and all in the general field of conservation. It follows, of course, that all of these applications also represent a distinct savings not only in the material phase but in the equally important element of production time, and in its natural sequence also in production costs.

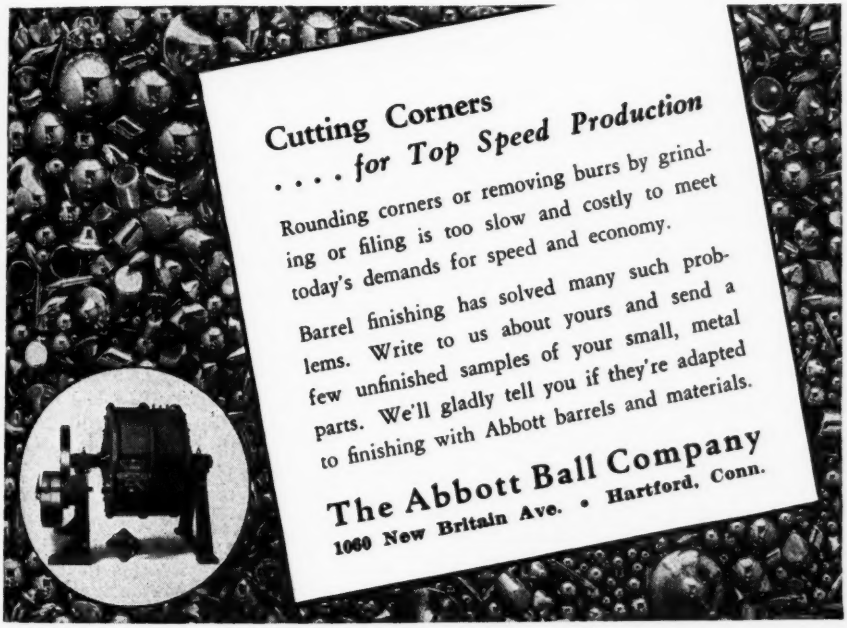
Now as to the entire series itself. Many of the current readers are not aware that this series started with the issue of PRODUCTS FINISHING for February, 1937, and that there has been one paper on some phase of the subject every month up to this concluding paper or a total of sixty papers over a period of five years. Many of the readers have been kind enough to say that it is generally considered that this series constitutes the most comprehensive coverage of any single phase of metal finishing ever attempted. In the form of letters received from readers, it is doubtful whether any other series has ever even approximated in number the letters of appreciation as well as those asking for more detailed information for procedure. These letters have long since passed being counted

# of Metal Products

in hundreds but go into thousands, and the very fact that these letters indicate that the readers have derived much of benefit from the series is perhaps one of the greatest compensations the writer of the series could possibly have. There is to us always a great source of personal satisfaction in knowing that we have been able to make the path a bit smoother for the other fellow, to help the average barrel operator to be a better operator and to turn in a far better class of finished work than he ever did before with credit both to himself and his employer.

All through the series we have never asked for any more consideration for barrel finishing procedure than that which it honestly merited, and that it was important to judge the procedure not from its superficial side alone, that is, the production of a bright finish, but its two more important factors, the hardening of electroplated surfaces for resistance to wear, and in this process of cold working, the closing of the always present pores in the plated surface to resist corrosion.

There are some who have said that this series seemed to be pointed to-


Cutting Corners
. . . . for Top Speed Production
Rounding corners or removing burrs by grinding or filing is too slow and costly to meet today's demands for speed and economy.
Barrel finishing has solved many such problems. Write to us about yours and send a few unfinished samples of your small, metal parts. We'll gladly tell you if they're adapted to finishing with Abbott barrels and materials.
The Abbott Ball Company
1060 New Britain Ave. • Hartford, Conn.

ward the elimination of polishing or buffing. This, of course, is ridiculous because both are most important methods for the surface treatment of metals. There are applications wherein barrel finishing procedure can be best used and again there are others where it would be completely impracticable. There are hundreds of instances where we have advised that while a barrel finishing program might be mechanically possible, that at the same time it would most certainly not be commercially practicable and for the inquirer to stick to his buffs and compositions.

We do not now, nor have we ever had any quarrel with the polisher. Time after time we have pointed out that we would be quite willing on a wide variety of parts to recommend that barrel procedure be used for its two most important factors which we have already mentioned, and then for the polisher to complete job with a simple coloring operation. We do not recall ever discussing such procedure with any polisher who had any dissenting opinion to offer, and for the greater part such operators would prefer to do all coloring rather than cut and color or any similar combination.

Now as to the practicability of all of the various recommendations made throughout the series. Nothing has been reported that has not actually happened. In other words, any operation mentioned has been either done by your author himself in the course of his research investigations down through the years, or else the operation has been done sometimes by his direction and sometimes without, by operators, but while he was personally present. Throughout this entire research we have never once taken the liberty of assuming a thing to be a fact without first determining it so to be.

Down through the series we have had hundreds of requests as to whether it was proposed to publish the information in book form. These inquiries started almost at the beginning of publication and have come in right along from others who got started somewhere along the line and want the complete data. Others have saved the papers from month to month with the idea of having them bound in book form when the series came to a close. This latter procedure we would not recommend for the reason that as our research continues we find new methods and new materials that largely replace some of those with our earlier recommendation. In a continuing research other than this could not be possible.

Right now we cannot say whether we will re-edit the series and prepare the manuscript for publication or not. It would require a great deal of work, the preparation of many operating tables, formulas, diagrams and illustrations not previously shown in the text of the monthly papers. Thus far, there have not been sufficient requests to warrant our going ahead and so our decision must be based on the wishes of those who are interested in barrel finishing and who would like to have the complete data in a bound volume.

If any of the readers would like such a book they will have to write and tell us so. A letter is not necessary and simply a postal card would suffice. This would not, of course, be interpreted as an order for a book, because we would first have to have an estimate of the cost and the number of books required, but for those who write to us indicating that they would like the book, we will later advise them what the cost will be and when the book will be available. In order to make such a book, if published, as complete as possible, suggestions would be appreciated touching on any of the phases of barrel finishing covered in the series, or for the amplification and perhaps more

thorough treatment of any special phase of the subject. All such suggestions will be very much appreciated and will be given the fullest consideration. If we are to compile the manuscript for such a book we would want it to be just as complete and authoritative as it would be humanly possible to make it, and criticisms of past texts are, of course, invited.

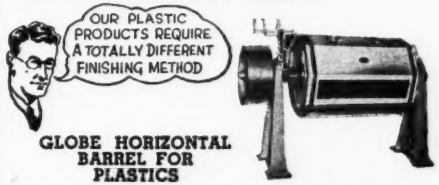
In peace time "business as usual" procedure, the American barrel manufacturers have always been able to take care of the demand for equipment with reasonable promptness, but now that we are at war and more intensive production is indicated and sure to be necessary, questions are beginning to come in to me as to whether barrels will be available when needed even though one has a priority. This, of course, we do not know.

We have thought though that there might be a great many among our readers who have one or more barrels on hand either installed or in surplus equipment storage, who would be willing to part with them to some who are on defense production and where they would be badly needed to speed up production on much needed metal parts. In such a case we would be happy to constitute ourselves a sort of clearing house for such barrels.

In order that we may compile some sort of list of equipment available, to those of you who have any such barrels, won't you please advise me at the earliest date possible. Describe the barrels or barrel, giving size in diameter and width, whether lined or unlined, tight and loose pulley or direct motor drive, name of maker, if you know it, and if the barrel has a number plate, please also note the serial number. You need not name any price, for the reason that an inquiry for a barrel of the type you have will be referred direct to you and the matter of price must

GLOBE DIRECT MOTOR DRIVE TILTING TUMBLING BARREL

Use Globe Tilting Tumbling Barrels for pickling, cleaning, finishing, and japanning. Patented work-shifting bottom provides 6 way tumbling action. Direct drive barrel tumbles at only 30 R.P.M. Slow speed results in better finishes.



GLOBE HORIZONTAL BARREL FOR PLASTICS

The Globe Horizontal Barrel for Plastics will remove fins and enhance the luster of delicate plastic objects. Eliminates costly hand processing methods. Shell is constructed of 1⅜" kiln-dried maple. Motor or belt drive.

GLOBE COMPARTMENT BURNISHING BARREL

Globe Compartment Burnishing Barrels can finish one, two, or three different parts for the same assembly thereby speeding production. Exceptionally strong and durable. Large doors for fast loading and unloading. Motor or belt drive.

FREE! Globe's new illustrated catalog P-6 is yours for the asking. Packed full of interesting information, it demonstrates how you can slash your finishing costs. Write today!

THE GLOBE MACHINE & STAMPING CO.
1900-1950 WEST 76TH STREET
CLEVELAND · OHIO

be between you and the party wishing to purchase.

This is equally true of steel burnishing material, whether round balls or some of the special burnishing shapes. If you have any reserve stock of such material that you can spare, please give us this information also. If this is going to be "all out" production, let us of the metal finishing field demonstrate that we can do our full part and go "all the way out to the very end."

So far as I am concerned there will be no charge for any work I might be called upon to do in getting your surplus barrel or materials in the right hands where they will be of help in this emergency. If you have a barrel or barrels and do not wish to sell them but would be willing to lend them to some manufacturer for the duration at some nominal rental, that might also be of great help, and such word from any of you will also be appreciated, but get this information through as quickly as possible so that it can be tabulated for instant reference.

And now, I want to ask every barrel operator who has followed this series a very pertinent question and here it is: **"Are you getting everything in the way of results from your barrel finishing equipment that you should be getting?** There are a great many short cuts in production procedure as well as many materials to be used that have not been covered in the text of the series. If you are located in an isolated section and have not had occasion or opportunity to see the newer methods this question might be somewhat difficult to answer.

We now have in course of preparation for the printer a very comprehensive questionnaire covering barrel finishing procedure. This will not be for broadcast distribution, but we will be glad to send it to any of our barrel operator readers or their employers, and especially so to those now on defense production. If there is a better way to do the job than the method you are now using then it is your duty to learn about it, and just as quickly as you possibly can. From your answers to this questionnaire we can form as a rule a fairly complete mental picture of just what you are doing, and this may enable us to point the way to increased production as well as better finishes and in most cases reduced production costs. If you feel this will be a help to you do not hesitate to ask for it.

We feel that is closing this series we should make proper acknowledgement for all the vast store of help and suggestions that have come to us and especially so from all of the officers and members of the various branches of The American Electroplaters Society where we have from time to time appeared as guest speaker; from the rank and file of platers on through to mechanical engineers, electrochemists and specialists in every phase covering the surface treatment of metals; from the manufacturers of barrels and burnishing materials, abrasives, and indeed everything that enters into barrel finishing procedure, the producers have been most helpful. We have repeatedly said that barrel finishing as a research subject had so many ramifications that it was seemingly impossible for one mind to encompass them all, and the reader will perhaps better understand this when we say that even though this series has gone for a full five years we still have available data to cover another five-year period without in any sense exhausting the subject.

Lastly a very sincere appreciation to the publisher of Products Finishing, Mr. Don G. Gardner and the official publication family. Everyone in it has been most helpful in every

way, and without their co-operation in interest, such a long series would have been impossible.

Closing of this 60 paper series does not mean that your author will discontinue all writing on his favorite topic, for there will be other papers from time to time covering important new phases as rapidly as they are developed.

For the very wide appreciation of the entire series as indicated by the hundreds upon hundreds of letters from all over the country; from Canada and South America as well as from far off Australia, all of them appreciative and encouraging, have done so very much to encourage your author to give the very best he had to the subject.

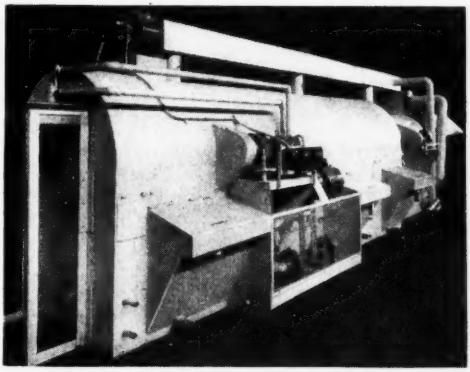
Facts About U. S. Government Finishes. Many manufacturers have been hampered in figuring on Government contracts involving specification finishes, which are usually identified only by code numbers, because of lacking material costs, thinning and drying data, and other essential information. In answer to this need, the Roxalin Flexible Lacquer Co., Elizabeth, N. J., announces publication of a convenient file folder entitled "Facts About U. S. Government Finishes." This folder contains data sheets on the widely used Army and Navy specification finishes and tells how and where they are applied.

With this information before him, it is now possible for a manufacturer, not heretofore familiar with Army and Navy finishes, to figure his unit costs accurately and establish the most efficient production schedule in keeping with his particular equipment.

The file folder and an up-to-date set of "Facts About U. S. Government Finishes" may be obtained by writing to Roxalin Flexible Lacquer Company, Box 511, Elizabeth, New Jersey.

Defense Savings Bonds may be registered in the name of one individual, or of two individuals as co-owners, or one individual and one other individual as beneficiary.

Are Your Defense Contracts Presenting
NEW WASHING and CLEANING PROBLEMS?



Ransohoff Equipment is helping many manufacturers solve their cleaning and washing problems; step up production; reduce costs and deliver better products.

Today, more than ever, in the rush for greater production, modern, dependable equipment pays extra dividends.

For better finishing of your products, write Dept. "P.F." for catalog or call a Ransohoff Representative

N. RANSOHOFF, *Inc.*

TOWNSHIP and BIG FOUR R. R. CINCINNATI, OHIO

Modern Gold Plating

By JOSEPH B. KUSHNER, CH.E.
Metal Finishing Consultant
New York City

FROM time to time in this series on gold plating we have pointed out that the protection a deposit of gold offers another, less noble metal, is purely mechanical. Gold in itself is non-corrosive and if we put a uniform, impermeable coating of it on a base metal, we get protection by reason of the fact that the gold plate does not permit corrosive influences to penetrate to the underlying metal. If the gold plate is sound and nonporous we get a reasonable amount of protection. If the gold plate is porous or otherwise defective corrosion is actually accelerated in most instances by the electrolytic cells that are set up between the gold and the base metal, in which the base metal acts as an anode, and the plated piece tarnishes in short order.

In the less expensive classes of gold plated work, lacquer takes on the protective duties that should have been assumed by the gold deposit. But very often lacquers fail in their job too, because the gold plate is so porous, residual deposits of chemical salts incompletely removed from the pores in rinsing, start an electrochemical action right under the lacquer. If the salts left in the pores are absolutely dry, no action takes place; but it must be remembered that many lacquers, even those classified as water proof, are permeable to moisture and water vapor. The moment an excessively humid day rolls around, some moisture penetrates the lacquer coat, reaches the chemicals in the pores and the piece starts to tarnish. This accounts in large measure for the fact that many pieces on display in a novelty jeweler's window or on a department store counter may show signs of tarnish and discoloration even though they have never been worn.

If lightly gold plated pieces have been properly rinsed to remove the last bit of active material from the pores and surfaces of the work, and properly lacquered, the pieces start to tarnish the moment the lacquer rubs off on the surfaces of greatest wear because now the acid secretions of the body have an opportunity to reach the base metal through the existing pores in the gold plate. The subject of porosity should therefore be of interest to the flash gold plater.

Where heavy deposits of gold are plated to avoid the use of lacquer or to meet certain quality specifications, the subject of porosity is of great interest because the porosity of the gold deposit is to a considerable extent a measure of the wearing qual-

Part 17

ity of the deposit. There undoubtedly is some correlation between the number of pores per square inch a given gold deposit and the tarnish protection it offers to the underlying metal under actual service conditions. Obviously, the more pin holes and pores there are in a gold deposit, the more opportunity there is for moisture, particularly acid laden moisture from body secretions, to penetrate to the easily corroded metal below.

Just what this correlation is we do not know since no research work has been published on this particular subject. We do know, however, that several manufacturers of fine quality gold plated goods have made a considerable number of porosity tests and have followed through by checking the same pieces under actual service, but they have not revealed their findings to the industry.

While no published data of any importance has been given for porosity tests of gold deposits, there has been a considerable amount of data published on the porosity of silver deposits. What holds true for silver probably holds true for gold since they are both metals of the noble class, and it is therefore of interest to study some of these results. The curves shown in the illustrations accompanying this article are based on those prepared by the American Silver Producers Research Project, Washington, D. C.

From a study of these curves, it can be seen at once that the porosity of a given deposit varies almost inversely with its thickness. Furthermore, this should be of interest to all who plate gold directly over nickel. There is a distinct reduction in the porosity of the silver deposit as the thickness of the underlying nickel deposit is increased. Again, Fig. 3 indicates that the smoother the finish of the underlying metal the less porosity there is apt to be in the overlying plate of silver. What holds true for silver in this connection undoubtedly holds true for gold.

Porosity of a gold deposit may be caused in a number of ways, among which are: (1) Presence of dirt particles in the solution, (2) low cathode efficiency (metals plate around hydrogen bubbles, leaving voids), and (3) the surface structure of the base metal. All of these conditions can be controlled to a large extent, so it behooves the manufacturer and plater to make occasional porosity tests in order to check up on their plating conditions and to get a comparative idea of the corrosion resistance of the plate.

Testing the Porosity of Gold Deposits

The "development" method of porosity testing as worked out at the U. S. Bureau of Standards makes an excellent foundation for the porosity testing of gold deposits as the method which was originally developed for testing of nickel deposits is easily applicable to gold.

Porosity of Gold Plated on Steel or Iron

The method of testing the porosity of gold on iron or steel is commonly referred to as the Ferroxyl test though it could more properly be called the ferricyanide test since this is the spotting re-agent used. Here is how you do it:

Prepare the following solution:

Sodium chloride.....50 grams
Gelatin .....50 grams
Water .....1 liter

Dissolve in all ingredients, then with the solution at about 35 deg. C., apply it with a clean camel hair brush to the surface of several sheets of 25 per cent rag content paper. Permit the paper to dry then cut it into strips of suitable size. This is the test paper.

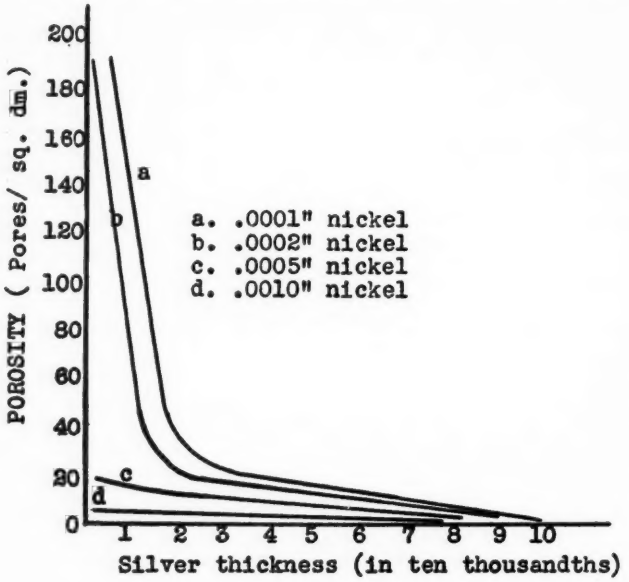


Fig. 1—Variation of porosity with thickness of silver deposit on differing nickel undercoats.*

Just before performing a test, wet a strip of the paper in a solution of ordinary salt (50 grams per liter) then quickly place the paper with the gelatin size in contact with the metal surface whose porosity is to be tested. Press it into firm contact with the clean metal surface and permit the paper to remain in contact for 10 minutes. The paper must be kept moistened with the salt solution all this while. Should it tend to dry out, apply fresh salt solution with a sponge or other form of applicator. On removal from the metal surface the paper strip is immersed immediately into a beaker containing the following solution:

Potassium ferricyanide ..10 grams
Distilled water..1 liter

It will be seen at once that those points where the salt solution was able to penetrate to the iron below (pores) and attack it, are now covered with blue spots formed by the reaction of the dissolved iron and the ferricyanide solution. The paper is now removed from the ferricyanide solution, rinsed and dried and forms a permanent record of the number of spots or pores on a given area of the work. The number of spots are counted and the result is registered as pores per sq. inch or sq. centimeter.

Porosity of Gold Plated on Copper or Copper Base Metals

To determine the porosity of thin gold deposits plated directly over copper or brass, prepare paper strips as before except that they are now coated with the following solution, instead of the previous one:

*Curve based on data given in "A Study of Silver Plating for Industrial Applications." A. S. R. P. R., 1939.

Ammonium chloride....50 grams
Sodium acetate.....20 grams
Gelatin (white).....50 grams
Water .....1 liter

A dry piece of paper prepared this way is dipped into a solution containing all above ingredients except the gelatin, just before use and is placed in close contact with the clean plated metal for a period of 12 minutes. On removal, the paper is quickly dipped into a solution of 10 grams of potassium ferrocyanide (note this is ferrocyanide and not ferricyanide as before), whereupon red spots will develop wherever there was a pore in the gold deposit. There are several other developing agents that may be used in place of the ferrocyanide but the ferrocyanide is the simplest of all to use.

Porosity of Gold Plated on Nickel

The following method while not completely satisfactory will be found to give fairly good results.

Prepare paper strips using the following coating solution:

Ammonium chloride....50 grams
Sodium acetate.....30 grams
Gelatin (white).....50 grams
Water .....1 liter

When dry and ready for use, moisten strip in a solution of the above that does not contain gelatin. Place in contact with the work for 15 minutes keeping the strip moistened all the while. Remove the paper and dip at once into a solution made up as follows:

Dimethyl glyoxime.....1 gram
Alcohol .....100 ccs.
Ammonia .....1 cc.

Wherever the corroding solution made its way to the nickel base, a distinct red spot will appear. Remove paper, rinse in clear water and dry for permanent record.

NO SHORTAGE HERE
for
KOLD GRIP
LIQUID GRAIN CEMENT AND SIZING COMPOUND

Replaces OTHER Adhesives on Polishing Wheels, Belts and Discs
Applied *COLD* to Hold

Abrasive Grain for ALL Types of Grinding, Buffing and Polishing

Grease Stick—Brass, Chrome, Copper Color, Nickel Finish—Tripoli and Stainless Composition. Samples and Literature Available.

THE PARK CHEMICAL COMPANY
8080 Military Avenue **Detroit, Mich.**

Knowing these simple porosity tests, several experiments might suggest themselves to the plater. Under like conditions he can make a test before and after filtering his gold plating solution to determine how filtration affects porosity; he may try the effects of various ways of preparing the base metal on porosity; he may try the effects of various conditions such as current density, temperature, and so on, on porosity and from these experiments reach an optimum procedure that will insure obtaining a minimum of porosity in his gold plate.

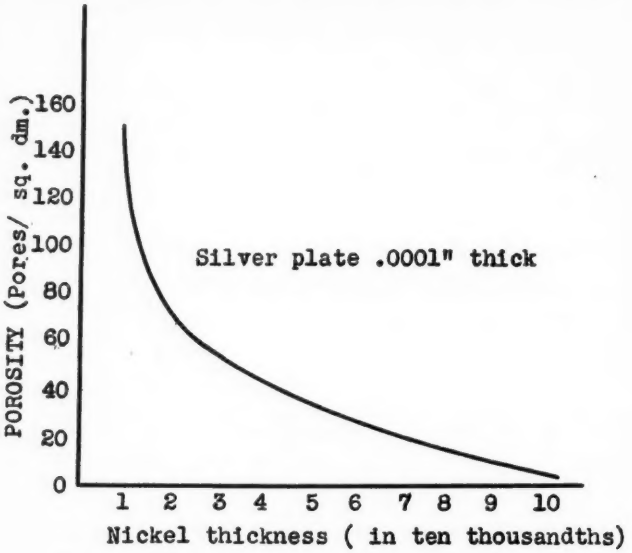


Fig. 2—Variation of porosity of silver plate with increasing thickness of nickel undercoat.*

Stripping Gold Deposits

On many occasions the gold plater will be called upon to strip gold deposits from rejected work. This is not a difficult task if the correct technique is used but from time to time difficulties will be encountered in the way of pitting and spoiling of the base metal. The essential point in stripping is to use a solution that will do the minimum amount of harm to the base metal, yet completely remove the gold.

Here are some solutions and methods for stripping gold from various types of base metal:

Stripping Gold From Copper and Copper Base Metals

It is a well known fact that copper and copper alloys are passivated when treated in concentrated sulphuric acid solutions in the cold. Advantage of this fact is taken in the following electrolytic strip:

Concentrated
sulphuric acid.....6 volumes
Water .....1 volume

Take great care in mixing these two to avoid spattering. Add the water to the acid cautiously, stirring constantly while so doing. When the solution is cool it is ready to be used as a strip. Carbon or copper, if any, may be used as the cathode and the work to be stripped is made anode. The voltage required is 6-8 volts. It will be noted that when first connected there is a vigorous evolution of gas bubbles which after a moment suddenly stop coming off the anode. If an ammeter is in series with the

*Curve based on data given in "A Study of Silver Plating for Industrial Applications." A. S. R. P. R., 1939.

circuit, the current will be seen to drop from its momentary high value to approximately zero. When this occurs, the work is completely stripped. A dark smut will be found on the copper and this is easily removed by dipping into a 10 per cent cyanide solution. Rinse in clear water and dry. Examination will show that there is little if any attack on the copper metal. This also points the moral that if a lot of small parts are to be stripped string them securely with copper wire to make sure they get good contact. Use of a wire basket is not recommended unless you have good contact with the parts.

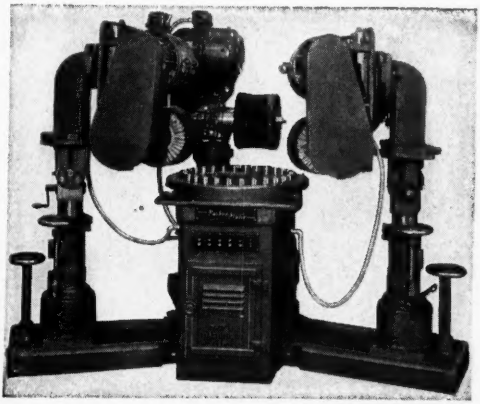
Exactly what occurs in this particular stripping operation is not known but probably what does happen is that the gold is momentarily dissolved by the persulphuric acid formed at the anode only to be precipitated on coming in contact with the main body of solution. The copper metal is not affected as it immediately becomes polarized on exposure to the persulphuric acid, because of the formation of a thin layer of nonconducting oxide or sulphate which is poorly soluble in the concentrated acid. Incidentally, the process has been patented.

Stripping Gold From Brass

To strip gold from brass basis metal we recommend the following solution:

Concentrated
sulphuric acid.....6 volumes
Lactic acid.....1/10 volume
Water .....1 volume

This solution is worked under the same conditions as the one given previously: 6 volts, carbon or copper cathodes, room temperature. The presence of lactic acid, the use of which was encountered by the writer by accident, seems to completely prevent any attack on the base metal.



AUTOMATICALLY
ON
PACKER-MATIC
POLISHING and
BUFFING MACHINES
Today's Efficient Method of Volume Finishing

Production Increased Lower Finishing Costs

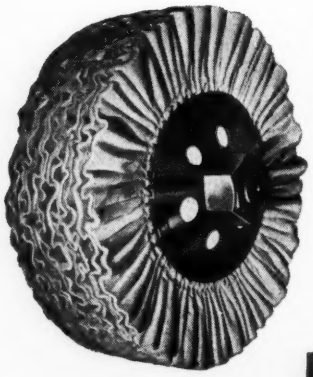
PACKER-MATIC
No. 424
CONTINUOUS
ROTARY

SEND SAMPLE
PART FOR
TIME STUDY—
WRITE DEPT. TS

AUTOMATIC POLISHING & BUFFING MACHINES
Packer-Matic
THE PACKER MACHINE CO., MERIDEN, CONN., U. S. A.

DEFENSE FOR

The most effective defense for your business against future times is a cash reserve. That's fundamental! Start now! You are assured of a positive 50% saving on your cotton buff wheel costs — plus faster work and longer buff life — if you switch to modern, AIRWAY VENTILATED BUFFS today.



WRITE US! WE'LL PROVE IT!

JACKSON BUF

21-03 41ST AVE.

WARNING NOTICE: Jackson Buff Corporation of Long Island Cit York, which have broad claims covering an air cooled buff having intends to protect all

OUR BUSINESS!

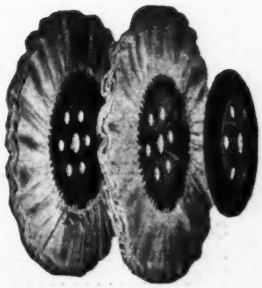
USE

AIRWAY *Ventilated* BUFFS

SAVE 50% ON YOUR COTTON BUFF WHEEL COSTS!

IMPORTANT AIRWAY FEATURES

1. Faster cutting and does not ridge the work.
2. Eliminates burning.
3. Raveling eliminated, requires no raking.
4. Saves compound.



WEARS TWICE AS LONG • COSTS HALF AS MUCH

F CORPORATION

LONG ISLAND CITY, N. Y.

nd Cit York, has rights to U. S. Patent Nos. Re 19,894 and 2,140,208 ving n the admission of air through the sides of the buff. Owner ct all nd stop infringement.

The polarization of the brass is almost instantaneous on removal of the last bit of gold.

Stripping Gold From Nickel

A considerable amount of gold is plated directly on nickel, nickel alloys and electrodeposits of nickel. To

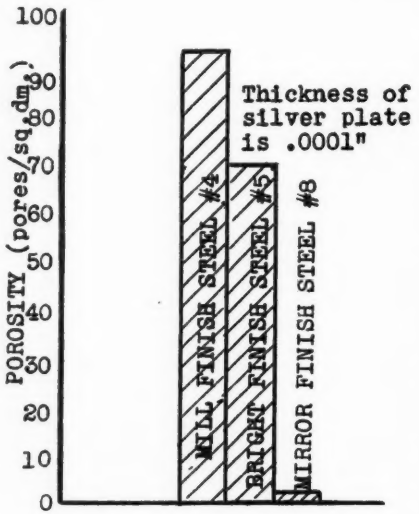


Fig. 3—Variation of porosity with surface quality of base metal.*

strip gold from metals of this nature several methods are available.

If the gold deposit is thin, that is, a flash deposit, the best method is to use a solution of the following type, without current:

Sodium cyanide.....4 oz.
Sodium hydroxide.....½ oz.
Water .....1 gal.

The solution is used at 180 deg. F., as an immersion dip. The work is suspended in baskets made of either iron or ceramic ware. Agitation of some sort is advisable to permit free access of the cyanide to all parts of the work. If it is desired to use this strip at room temperature, a few ccs. of hydrogen peroxide or a few crystals of ammonium persulphate mixed in will help speed the operation. The addition of these oxidizing re-agents will cause a vigorous bubbling of the cyanide so be careful in introducing them.

Should the gold deposit be over a bright nickel plate of any substantial thickness, very little damage will be done to it or the metal underneath it and the nickel deposit will retain most of its original luster. If, of course, the nickel deposit is thin and porous, the metal underneath will be susceptible to attack by the cyanide. This may cause corrosion and complete discoloration and (or) possible disintegration of the nickel plate. In a case like this it is best to strip off what remains of the nickel plate by one of the standard methods.

Where the gold deposit is a heavy one, the rate of solution of the gold by the immersion cyanide dip will be relatively slow, so it is advised that current stripping be used for this case. Here is a current strip solution:

Sodium cyanide.....6 oz.
Potassium ferrocyanide.....2 oz.
Sodium hydroxide.....½ oz.
Water .....1 gallon

The temperature of operation is 180 deg. F. The cathodes can be made of copper, carbon or lead. The work is made anode and suspended in an iron wire basket and a voltage of 6 volts is used. Agitation is necessary to speed the process and to prevent polarization which is prone to occur if the current density goes too high. Occasionally, a little rochelle salt is added to this solution on the assumption that it inhibits attack of the base metal but as far as nickel is concerned its presence seems to make

*Curve based on data given in "A Study of Silver Plating for Industrial Applications." A. S. R. P. R., 1939.

little difference, in this writer's experience.

Where gold is stripped to be recovered by the plater himself, we highly recommend the use of a porous cup in stripping. If a porous cup is not used, gold accumulates on the cathode and in the solution, making a double job in refining, as the gold must be scraped off the cathode, or the cathode must be thrown in with the refining wastes. It is much better to use a porous cup and have all the gold concentrated in the solution for easy refining. Incidentally, there are several American concerns now making porous cups that are superior to those made in Germany, our main, former source of supply for this item.

In using the porous cup method of stripping, use the same solution given previously for the anode compartment and fill the porous cup to solution height with the following solution:

Sodium cyanide.....10 oz.
Water .....1 liter

Use steel cathodes and connect as shown in the diagram Fig. 4. If the porous cup method is to be used for stripping in acid solutions use the same concentration of acid inside the cup as was used outside.

Stripping Gold From Iron and Steel

The same solutions that were given for nickel may be used for stripping gold deposits from iron and steel. Depending on whether the metal deposit is heavy or light a non-current or current strip is used. Unfortunately, as with nickel, some attack of the underlying metal cannot be completely prevented but with continuous agitation to bring all gold plated surfaces into contact with the cyanide

METSO CLEANERS SUSPEND DIRT
Vital to electroplating is the cleaner's ability to free the metal surface from all dirt, grease and oil. Metso Cleaners do more than remove the dirt; they suspend removed dirt, preventing its redeposition on the cleaned surfaces.
This "suspending" action is a special function of the silica (SiO_2) content of the Metso Cleaners. May we tell you more about the role of silica in Metso Cleaners and how it serves in all kinds of metal cleaning?
PHILADELPHIA QUARTZ COMPANY
General Offices and Laboratory: Ionic & 3rd Sts., Philadelphia
Distributors in over 65 cities
Established 1831
METSO

"Ordinary Type Dust Collectors Must Not Be Used for Removing Magnesium Dust"

. . . So Say Leading Chemical Engineers

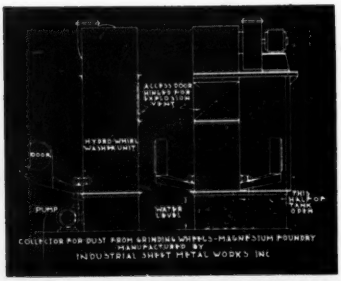
The Hydro-Whirl meets all requirements for magnesium dust control.

Its high efficiency is attributed to the effective manner in which all dust is trapped in the water. This new principle of dust control introduces the vital factor of safety which results in reduced explosion and fire hazards.

This collector is recommended by one of the largest fire insurance companies in the country.

If you process magnesium—grind, buff or polish — you need the most efficient way of arresting the dangerous action of the dust. The Hydro-Whirl has it.

Send for the new folder



COLLECTOR FOR DUST FROM GRINDING WHEELS—MAGNESIUM FOUNDRY MANUFACTURED BY INDUSTRIAL SHEET METAL WORKS INC

Industrial Sheet Metal Works

Makers of Hydro-Whirl Dust Collectors and Spray Booths, Chemical Plant Washers Complete Engineered and Installed

630 EAST FOREST AVE. DETROIT, MICH.

this attack is held to a minimum. In this connection it is quite possible that the use of a wetting agent might

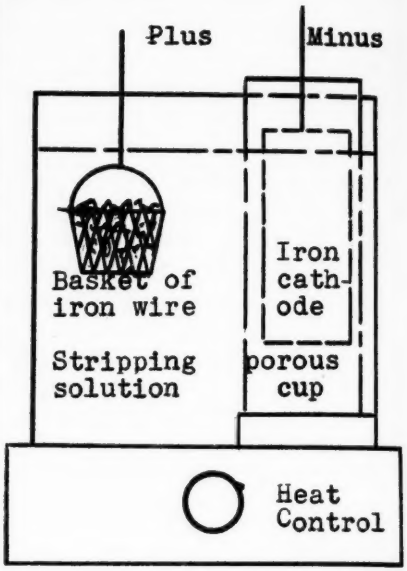


Fig. 4—Stripping by the porous cup method.

conceivably give material aid in keeping down pitting, the main bugaboo of the stripping operation.

Stripping Gold From Silver

There are occasions when gold deposits have to be stripped from silver. For this purpose, we suggest the following solution:

Concentrated hydrochloric acid	4 oz.
Glycerine	1 fluid oz.
Water	1 gallon

Use the solution cold. Six volts. Carbon cathodes. Avoid agitation as agitation tends to remove the thin protective film of silver chloride that forms on the base metal.

Defense Savings Pay-Roll Allotment Plan

How company heads can help their country, their employees, and themselves

voluntary pay-roll allotment plan | helps workers provide for the future | helps build future buying power | helps defend America today

This is no charity plea. It is a sound business proposition that vitally concerns the present and future welfare of your company, your employees, and yourself.

During the post-war period of readjustment, you may be faced with the unpleasant necessity of turning employees out into a confused and cheerless world. But you, as an employer, can do something *now* to help shape the destinies of your people. Scores of business heads have adopted the Voluntary Pay-roll Allotment Plan as a simple and easy way for every worker in the land to start a *systematic* and *continuous* Defense Bond savings program.

Many benefits . . . present and future. It is more than a sensible step toward reducing the ranks of the post-war needy. It will help spread financial participation in National Defense among all of America's wage earners.

The widespread use of this plan will materially retard inflation. It will "store" part of our pyramiding national income that would otherwise be spent as fast as it's earned, increasing the demand for our diminishing supply of consumer goods.

And don't overlook the immediate benefit . . . money for defense materials, quickly, continuously, *willingly*.

Let's do it the American way! America's talent for working out emergency problems, democratically, is being tested today. As always, we will work it out, without pressure or coercion . . . in that old American way; each businessman strengthening his *own* house; not waiting for his neighbor to do it. That custom has, throughout history, enabled America to get things done *of its own free will*.

In emergencies, America doesn't do things "hit-or-miss." We would get there *eventually* if we just left it to everybody's whim to buy Defense Bonds when they thought of it. But we're a nation of businessmen who understand that the way to get a thing done is to *systematize* the operation. That is why so many employers are getting back of this Voluntary Savings Plan.

Like most efficient systems, it is amazingly simple. All you have to do is offer your employees the convenience of having a fixed sum allotted, from each pay envelope, to the purchase of Defense Bonds. The employer holds these funds in a separate bank account, and delivers a Bond to the employee each time his allotments accumulate to a sufficient amount.

Each employee who chooses to start this savings plan decides for himself the denomination of the Bonds to be purchased and the amount to be allotted from his wages each pay day.

How big does a company have to be? From three employees on up. Size has nothing to do with it. It works equally well in stores, schools, publishing houses, factories, or banks. This whole idea of pay-roll allotment has been evolved by businessmen in cooperation with the Treasury Department. Each organization adopts its own simple, efficient application of the idea in accordance with the needs of its own set-up

No chore at all. The system is so simple that A. T. & T. uses exactly the same easy card system that is being used by hundreds of companies having fewer than 25 employees! It is simple enough to be handled by a check-mark on a card each pay day.

Plenty of help available. Although this is *your* plan when you put it into effect, the Treasury Department is ready and willing to give you all kinds of help. Local civilian committees in 48 States are set up to have experienced men work with you just as much as you want them to, and no more.

Truly, about all you have to do is to indicate your willingness to get your organization started. We will supply most of the necessary material, and no end of help.

The first step is to take a closer look. Sending in the coupon in no way obligates you to install the Plan. It will simply give you a chance to scrutinize the available material and see what other companies are already doing. It will bring you samples of literature explaining the benefits to employees and describing the various denominations of Defense Savings Bonds that can be purchased through the Plan.

Sending the coupon does nothing more than signify that you are anxious to do *something* to help keep your people off relief when defense production sloughs off; *something* to enable *all* wage earners to participate in financing Defense; *something* to provide tomorrow's buying power for your products; *something* to get money *right now* for guns and tanks and planes and ships.

France left it to "hit-or-miss" . . . and *missed*. *Now* is the time for *you* to act! Mail the coupon or write Treasury Department, Section A, 709 Twelfth St. NW., Washington, D. C.

FREE - NO OBLIGATION

Treasury Department, Section A,
709 Twelfth St. NW., Washington, D. C.

Please send me the free kit of material being used by companies that have installed the Voluntary Defense Savings Pay-Roll Allotment Plan.

Name _____

Position _____

Company _____

Address _____

Electroplating: Past and Forecast

By BUZZ BARR

EVENTS have been moving at express train speed since our last Past and Forecast Electroplating Review. Last year we were a nation at peace. Now we are a nation at war. We pointed out in January, 1941, "because of the war situation, European research in electro-deposition has almost reached the vanishing point as far as commercial developments are concerned." Is it our turn now to have the lamps of scientific research in plating extinguished? Let us hope not. Some long faced plating pall bearers are already predicting the complete eclipse of plating because of lack of materials and the inroads of plastics. "It'll never come back," they mumble. To those we say: The art and science of electroplating is going to be advanced further than ever before, because of the war, and we are going to witness an expansion in this field never dreamt of before.

Before we go ahead with the regular review, let us see what happened to our plating prognostications of last year. We said: "Look out for increased use of plating rectifiers." Two new rectifier companies have entered the plating field since January, 1941, and rectifier sales are booming, particularly in the defense industries. Many of the aircraft plants are now using rectifiers for their anodizing work. Mark one for old Buzz Barr.

We said: "There will be an increasing use of higher current, higher metal concentration, bright plating baths." High concentration rapid plating baths particularly for copper, both acid and alkaline, nickel, zinc and tin and brass are now in wider use than ever before, with especial emphasis on defense work. Chalk another one up.

We said: "A really bright silver plating process will make its appearance." This was a little premature. It looks as though the shortage in other plating metals will force the issue, however, and we are more sure than ever about that bright silver for the coming year. Goose egg for the prognosticator.

We said: "There will be increased use of specifications for plated deposits and a greater interest in plating control." What with the shortage of materials and the hard demands of the Army and Navy Procurement Departments, we don't even have to discuss this any further. Another one for Buzz!

We said: "Look out for new electropolishing methods." There are more patents now on the subject than you can shake a stick at. One of the latest is that applied for by Sealtest, Inc., involving the use of lactic acid for electropolishing steel. This concludes last year's forecast, now let's have a closer look at the record.

Anodizing

Studies were made by Edwards and Keller which proved beyond a doubt that the aluminum oxide coatings were amorphous in structure. The chromic acid process of anodizing was discussed by Mozley who made a thorough investigation on the subject in connection with the airplane industry. The chromic acid process was also considered by Sanz. A paper by Holmon compared the chromic acid and sulphuric acid processes.

Brass Plating

No new or startling developments made their appearance in 1941. The rapid brass plating bath developed commercially in 1940 has been improved and is now used in defense work to a large extent. A very comprehensive paper on brass plating was written by Coats who discussed in detail the various types of brass plating baths. One of his recommended baths is the following:

Copper cyanide
.....26.2 grams/liter

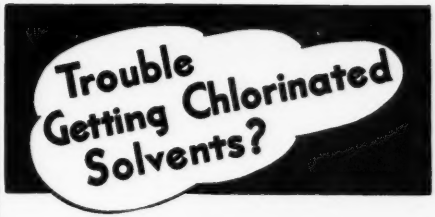
Zinc cyanide
.....11.3 grams/liter

Total sodium cyanide
..... 45 grams/liter

Brass anodes 25 per cent zinc. Cathode efficiency 75 per cent. Anode efficiency 90 per cent. His discussion also gave the factors influencing the ratio of copper to zinc in the deposit, PH, current density, temperature, free cyanide, metal ratio, arsenic content.

Chromium Plating

A great deal of hard chromium plating is now being done in ordnance work. A comprehensive review of the subject of hard chromium plating was written by Mankowich. Another paper by Thews discussed the ad-



Here's a better and Cheaper Method for Metal Degreasing!

The Magnus Emulso-Dip or Emulso-Spray method of cleaning metal parts solves the problem completely:

- It replaces solvent or vapor degreasing.
- Does a quicker, better, more thorough job —at lower cost.
- Handles smut and difficult dirts not readily removed by other methods.
- Can be used without heat on many operations.
- Is applicable to all types of metal cleaning.
- Has been successfully used for months in many defense plants.

MAGNUS EMULSO-DIP . . MAGNUS EMULSO-SPRAY

Two variations of same new metal cleaning method. Adaptable in many cases to existing washing machines. If not, we will design and build Magnus Emulso-Dip or Emulso-Spray washing machines to meet your particular problems.

Get the complete story now. Emulso-Dip or Emulso-Spray can save you time and money and insure speedy production of your vital war orders.

Magnus Chemical Co.

Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants.

208 South Ave., Garwood, N. J.

MAGNUS CLEANERS

vances in techniques of hard chromium plating. In a study presented to the American Electrochemical Society, Dubpernell gave a comprehensive review of the subject including its history and modern chromium plating methods.

Cadmium Plating

Soderberg and Westbrook presented a complete discussion of the subject to the American Electrochemical Society.

Copper Plating

There were several interesting developments in copper plating. First was the regular commercial development of the new pyrophosphate copper bath which gives lustrous and semi-lustrous deposits of copper in a bath whose pH is close to the neutral point. The bath has a composition of copper metal of about 5 oz. per gallon, pyrophosphate content of 20 oz. per gal. a buffer salt and a small amount of ammonia. Of further interest is the fact that there are no brighteners or wetting agents in this bath. Current densities run from 20-40 amps. per sq. ft. and temperatures from 100-140 deg. F. The cathode and anode efficiencies are about 100 per cent. The copper is in bivalent form.

Another development of interest was the attempt made by investigators Smith and Munton to use citrate additions to the cyanide copper plating bath instead of rochelle salt. The reason for this being the scarcity of argol, product of war-torn Europe. Unfortunately, however, even though these investigators met with success, our own citric acid industry is none too good, so this interesting idea may be stymied right from the start.

Oplinger discussed some of the recent improvements in the High Speed copper process, including the use of KOH instead of NaOH to give better current density characteristics. His discussion also took up the old type rochelle copper solution.

Maher studied the effect of the pH of the Rochelle copper solution on the adhesion of the copper plate to zinc die castings. The Rochelle salts copper bath was discussed at the American Electrochemical Society convention by Graham and Read who gave a comprehensive paper on the subject. The grain structure of copper deposits as influenced by various factors in the acid copper solution was studied by Butts and Nora. Newton and Furmer investigated deposition of copper from concentrated ammonia solutions.

Cobalt Plating

One paper on the subject made its appearance. The paper by Soderberg, Pinner and Baker gives a complete resume of the art.

Gold Plating

No new developments of any particular interest were announced in the gold plating field. A paper by Bruhns gave a descriptive outline of the gold plating of cigarette and vanity cases. During the course of the year Kushner continued his comprehensive series of articles on gold plating in this magazine. Among the subjects treated were: The Bek Process, barrel plating with gold, gold encasing, dragout, colored gold deposits, cyanide substitute gold baths, gold plating control and analysis methods and gold plating on plastics. The series is to be continued. A patent was granted to Kushner on gold plating steel direct.

Indium Plating

Linford presented a paper to the American Electrochemical Society on the subject of indium plating. He

proposed an indium sulphate plating bath which he claimed gave smooth, matte, adherent deposits.

Lead Plating

No papers were presented on this subject and no new developments were announced. Nevertheless a great deal of lead plating is being done in certain defense applications.

Nickel Plating

The Watts hot nickel bath plus brightening agents reigns supreme in the bright nickel plating field. A number of papers were published on various phases of the subject and several patents on new brightening agents were issued. A comprehensive discussion of modern nickel plating in all its ramifications was presented to The Electrochemical Society by Pinner, Soderberg and Baker. The effect of various addition agents in the nickel plating bath was described by Linick. He found a complex organic compound of tantalum to be an excellent brightener. An investigation into the adhesion of nickel deposits by means of the Ollard adhesion test was made by Roehl. The subject of filtration in preventing porous nickel plates was discussed by Green. A description of the uses of nickel and copper plating in the printing industry was given by Dowd at the June Convention of the Electroplaters' Society.

Rhodium Plating

Weisberg discussed the various types of rhodium plating baths and their plating characteristics.

Silver Plating

A new type of silver plating bath containing the hydrocyanide of guanidine and analogous ammines was proposed by Gilbertson and Mathers. The bath, particularly when made up

Faster Production
Greater Economy
—use Genuine BIAS Buffs

In these hectic days, speed and expert performance are demanded — even in buffs. Genuine BIAS Buffs are made of selected material from our own mills; combined with a special method of construction by workmen skilled in the art, a buff is produced that gives longer service, works faster, costs less in the end than any ordinary buff in existence.

There's a BIAS Buff made for every buffing job. Use them. We also make BIAS Ventilated Buffs.

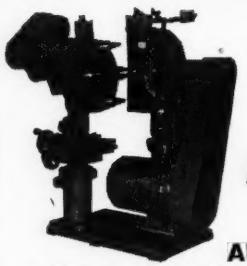
The BIAS BUFF *and* WHEEL CO., Inc. 430 Communipaw Ave. Jersey City, N. J.

with ethylene diammine hydrocyanide gives smooth deposits. A paper on the general subject of silver plating was delivered to the fall convention of the Electrochemical Society, by N. Promisel and D. Wood. A very interesting method for measuring the thickness of silver deposits by means of X-Ray absorption pictures was proposed by Woods. A potentiometric method and the Diphenylcarbazone method were proposed for analyzing silver plating baths for silver content, by Read and Read. Savage and Pfefferle described a new type of full automatic silver plating installation for the plating of band instruments.

Tin Plating

A new immersion tin process for tin plating brass and copper was announced. Irenas published a paper on alkaline tin plating. Acid tin plating solutions were discussed by Pine. Alkaline tin plating solutions were discussed by Oplinger and Baush. A great deal of tin plating both from alkaline and acid solutions is now being done in the defense industries.

Get Hep to This for Polishing and Buffing! Faster and Cheaper



ACME SEMI-AUTOMATIC and Lathe Combination Unit

One of the many Acme Automatics designed to speed up production and reduce production costs. Send sample for free production estimate.

ACME Manufacturing Co.
1642 HOWARD ST. • DETROIT, MICH.
Builders of AUTOMATIC POLISHING AND BUFFING MACHINES FOR OVER 25 YEARS

Zinc Plating

There has been a great deal of activity in the zinc plating field. With cadmium plating vanishing from the scene for reasons of cost and new and improved zinc plating processes available, zinc plating has come to the forefront in corrosion protection, particularly in ordnance work. An interesting patent was granted this past year for an acid zinc plating solution containing trimethylamine which permits the bath to produce smooth adherent deposits at high current densities. Another process, developed in England, is called the Alkan Process which is performed in two stages; first, an alkaline zinc bath following with an acid zinc bath. Time required in each bath is about 10 minutes, during which period a .0003 in. deposit is put on in each. Acid zinc plating was thoroughly discussed by Lyons at The Electrochemical Society meeting in October. He gave a number of formulae for plating baths among which was the following one:

Zinc sulphate	48 oz. per gal.
Ammonium chloride	4 oz. per gal.
Sodium acetate	2 oz. per gal.
Glucose	1 oz. per gal.

Schlotter and Schellenmeir discussed the behavior of zinc plating baths. Hull and Wernlund presented a paper on the cyanide zinc plating bath including the matte and bright types.

General Developments

Metal Coloring: There wasn't much activity in the metal coloring field, since most of the emphasis this past year has been on protective and not

on decorative plating. A new process for blackening copper by electro-oxidation was announced. At the Boston Convention of the Electroplaters' Society, Stareck gave a comprehensive talk on Electrocolor and Patternplate. He showed how production of thin films of copper oxide produces the variation of colors by interference and showed how partial reduction of the oxide at given nuclear areas gives rise to definite patterns in the coating and thus producing what is trade named as Patternplate.

Electropolishing: Developments in electropolishing were many. There were a number of papers and a number of patents issued. Some of the methods are now in highly successful use in a number of plants throughout the country. We are still waiting a good electropolishing method for alloys such as brass and bronze, however. Papers on the electropolishing of steel and iron were given by Uhlig, Lang, Faust and Pray, and Tour. The prospects in this field are bright.

Rectifiers: Things are humming here. Two new companies entered the field since last January. One with a copper oxide instrument the other with a selenium rectifier. In spite of the typical horse and buggy reaction of the old-timers, the rectifier is making definite inroads into the territory formerly ruled by the generator. It's up and coming. Papers appeared by Reinken, Lee and others. The discussions took up efficiency and compared the instrument to the generator.

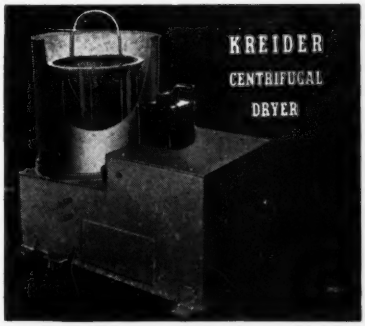
Alloy Plating: Copper lead alloys plate from ethylene diamine solutions were investigated by Roszkowski and co-workers. They got hard, bright adherent but brittle deposits from baths containing:

Copper as cupric oxide ..... 28.6 grams
Lead as plumbous hydroxide ..... 8.6 grams

All dissolved in a liter of 7.2 per cent ethylene diamine solution. The presence of a wetting agent helped in reducing brittleness. A comprehensive paper on alloy plating was contributed by Faust to The Electrochemical Society Convention in October.

Plating Theory: There were a number of outstanding developments in the field of theory. Of great interest was the method of Brenner in studying cathode films in plating. His method consisted in suddenly freezing the electrolyte in contact with a cylindrical cathode and turning down on lathe to a given thickness of the cathode film. He obtained some extremely interesting results. Graham and Read made some further refinements in their "hole-in-cathode" method of studying electrode surface layers. Allen Gray gave a paper on

Boost Speed and Quality of Drying...Reduce Drying Costs



Centrifugal Drying gives your plating room fast, easily controlled drying that speeds and improves your production — reduces your costs. The new Kreider Centrifugal Dryer assures modern high-speed drying at its best. This Kreider Dryer is simple in design, easily operated by one semi-skilled worker. *Auxiliary Heating Unit—optional equipment.*

Send for Bulletin and Prices.

DELLINGER MFG. CO., 729 N. Prince St., Lancaster, Pa.

the significance of and control of pH in alkaline cyanide plating solutions. A short study by Hogaboom took up the subject of throwing power in plating solutions. The subject of metallurgy as it relates to plating was taken up by Conley. Glasstone started a series of articles on the Principles of Electrochemistry and Electrodeposition. A paper on control pH was presented by Bjorkland. An extremely comprehensive discussion of the general principles of plating was put forth by Blum, Meyer and Beckman in which they discussed every major and minor phase of the art and science of electroplating. The constitution and properties of cyanide plating baths were discussed by Thompson. There were several papers on surface tension measurement as related to electroplating solutions and pickling, by Hartshorn and Young and Roszkowski.

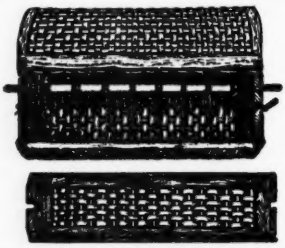
Plating on Non-Conductors: A number of articles appeared on this subject, particularly fine were those of Wein, Hepburn and Kushner. The methods remains the same: Reduction of silver on the surface followed by a copper plate.

Plating on Aluminum: There were some refinements made in the Travers Chrome Alume Process and an interesting patent to Frasch making use of complex organic salts of nickel for plating aluminum was granted by the U. S. Patent Office.

Impurities in Plating Solutions: There was considerable attention paid to this subject during the past year. Undoubtedly the development of greatest interest was the method originated by Beckwith for removing chromium contamination from alkaline copper cyanide solutions by use of sodium hydrosulfite. A number of other papers discussing in general terms the impurities, effects of impurities and their removal from plating solutions, appeared. Among the authors were Helbig, Meyer, Stocker, Weisberg. A paper of interest was that of Diggin, who took up the subject of impurities in water used in the plating room.

Electroplating Economics and Engineering: Beyond the shadow of a doubt the greatest interest in the plating field this year was the subject of economics: What to do about metal and chemical shortages? The other question was: What about substitutes? The trend at the start of the year when nickel became scarce was to increase copper thickness and follow with lighter platings of nickel. But now copper is scarce. What next? Papers that discussed the effects of priorities on the plating industry were given by Blum, Stratton and several others. At the present moment the situation seems bad for non-defense platers.

The use of laminated plastics in the plating industry was discussed by

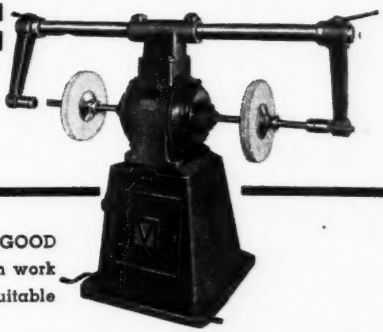
INVESTIGATE
FOR SOMETHING
BETTER
SIZES FOR ANY EQUIPMENT
KING

PLATING BARRELS
Write for illustrated folder.
Use them once—you'll use them always
JOHN KING
48 SPRINGFIELD ST. DAYTON, OHIO

Bennet. The use of rubber was taken up by McHugh. The subject of ventilation for plating tanks and rooms was taken up by Battista and co-workers. A study on the treatment of plating room wastes which incidentally is certain to become of increasing importance was described by Hodges. Automatic equipment for plating was taken up by Schaffer. Hendershott discussed plating room control. The subject was also taken up in the British Metal Industry Magazine in comprehensive form. Kettering gave an interesting talk to the Electroplaters' Society on the Application of Modern Science and the Chemical Engineer. A number of papers describing the metal finishing and plating practices in the airplane industry made their appearance. The Salt Spray Test was discussed pro and con by Hirsch. Polishing of steel prior to plating was considered by Lux, research associate at the Bureau of Standards appointed by the American Electroplaters' Society. A paper on specification plating by Young and co-workers appeared in this periodical. Another paper by Young discussed electroplating education. There were several papers on electrolytic etching. The cleaning of cold rolled steel was discussed by Lyons. Plating of nickel without nickel anodes was discussed by Diggin and others.

Prognostications: We cannot deceive ourselves. Things do look pretty bad at the moment, but let's hope for the best. Looking into the crystal ball we see: a bright silver plating process; a new and improved method of plating control; widened and increased use of electroplated plastics; an increasing use of rectifiers.

Do your share to preserve the American way of life. Invest regularly in Defense Savings Bonds and Stamps.

MARSCHKE BUFFERS



ONE BUFFING MACHINE IS *NOT* AS GOOD AS ANOTHER unless it is equally fast in work finished, equally dependable and as suitable for the job.

Whatever your buffing requirements, count on Marschkes for superb service. Standard models of bench, pedestal and swing frame Marschkes from 1 to 15 HP, in single or selective speeds, usually fill the bill. Special Marschkes like the adjustable clearance buffer shown here, take care of special probems.

Marschkes are Hercules for work, Methuselas for long, trouble-free life. Before you buy a new buffer see all that Marschkes offer! Write for Catalog today, to

VONNEGUT MOULDER CORPORATION • **1845 Madison Ave., Indianapolis, Ind.**

Review of Progress in the Industrial Finishing Field

By G. KLINKENSTEIN
Vice-President and Technical Director
Maas & Waldstein Co., Newark, N. J.

THE industrial finishing industry, like many others, has been thrown off its normal course by the demands of defense production and the operation of priorities on raw materials. However, makers of goods without high priorities have not been prevented from obtaining finishes to meet their needs from manufacturers in position to meet rapidly changing conditions.

These changes involve both the kinds of finishes and the raw materials that are available to producers of non-essentials. Some of the ingredients commonly used in lacquers and enamels, such as nitrocellulose, certain solvents, many types of pigments, especially whites, synthetic resins of the phenol-formaldehyde, alkyd, and urea-formaldehyde groups, and aluminum powder, can be supplied only in limited quantities, or not at all, for use by the non-essential industries.

At the same time, these industries have, in many cases, been forced to make one or more drastic changes in the composition of their products. Thus, certain manufacturers have had to switch from metal to a plastic, and then again to wood, paper mache, or other material. Both kinds of changes create new problems for the industrial finishing industry to solve with a minimum loss of time.

The result has been the development of a series of finishes based on castor oil, soy oil, linseed oil, various organic acids, and other substances that are not likely to be limited in supply by either our defense needs or by military operations, as is the case with tung oil and phthalic anhydride. In the hands of formulators with adequate skill, very satisfactory substitute finishes are thus being produced, and, in many cases, permanent additions are being made to our list of useful finishes.

Since we are planning to double our defense output in 1942 as compared to 1941, the difficulties of manufacturers without high priorities are bound to increase, but they need have no special concern about the finishing situation, unless events take a totally unexpected turn. Solving special problems has always been the chief business of certain manufacturers of finishes, and this kind of experience is of particular value at this time.

The defense and essential industries are, of course, using finishes of all kinds in large quantities, and not much trouble has been experienced in

supplying them. At this time last year, defense work was being hampered by the fact that the government specifications for finishes were largely obsolete. This situation has been remedied. In fact, the finishing industry is now urging the government to reduce its consumption of the most modern types of finishes wherever possible, so as to permit a large amount to go to non-defense industries.

For the use of the defense industries the heaviest demand is for air-drying and baking alkyd synthetic enamels and air-drying lacquers. Wrinkle enamels are being used for special jobs, such as finishing radio cabinets, telephone panels, and small instruments.

The development of high-speed finishes and the rapid radiant heat baking process has greatly helped to speed up the production of defense products. The finishing room need never be a bottle-neck in any important industry.

Plastikon Rubber Putty. The B. F. Goodrich Company, Akron, Ohio, is now issuing a new catalog section on its Plasticon Rubber Putty. This section is of particular interest now, since so many defense emergency jobs require specialized materials that meet rigorous service requirements.

The section describes the properties of the product, non-hardening, corrosion resistant, waterproof, air-tight, no mixing required, quick drying and excellent adhesion, lists the grades, gives directions for use and a large list of applications in which it has proved successful.

These latter include glazing, use in chemical plants, plumbing, air-conditioning of buildings or rooms, marine service, general construction and automotive.

Copies free upon request.

Do your share to preserve the American way of life. Invest regularly in Defense Savings Bonds and Stamps.

FOR DEFENSE!

1,000—1" Buckles Lacquered per minute
500—Large Cartridge Clips coated per minute with R 200

"SPEEDIP"
WHIRL ENAMELER and Coating Machine

No Waste in Time or Materials

A combination dipping-whirling machine for completely coating large quantities of small parts with lacquer, enamel, paint, oil, wax, etc. • All operations are within the machine. Parts are dipped into coating material, raised and whirled. Time—as little as 30 seconds. Speeds up production—cuts finishing costs—saves coating materials. • Write for further details or send samples to be coated.

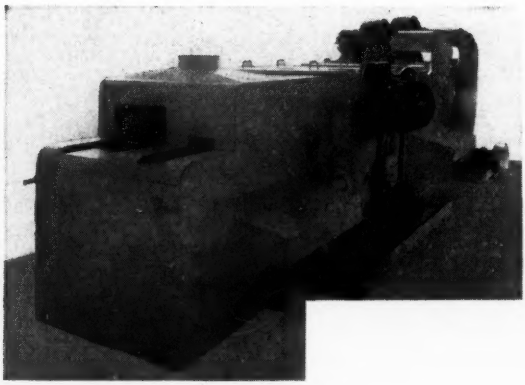
RONCI MACHINE CO.
45 River Avenue Providence, R. I.

R-200

. . . the 1941 Finis

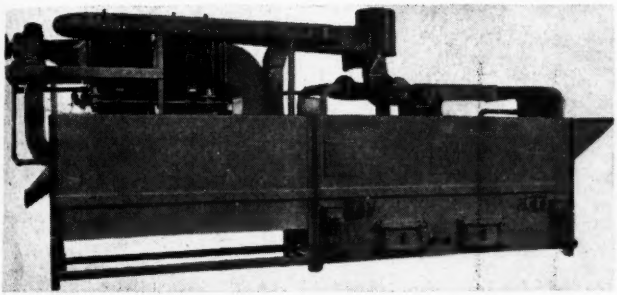
To provide a quick and easy reference to many of the important equipment and material developments which were placed on the market during the past year, this review section is divided into four brief parts under the headings Cleaning, Plating, Polishing and Finishing.

CLEANING



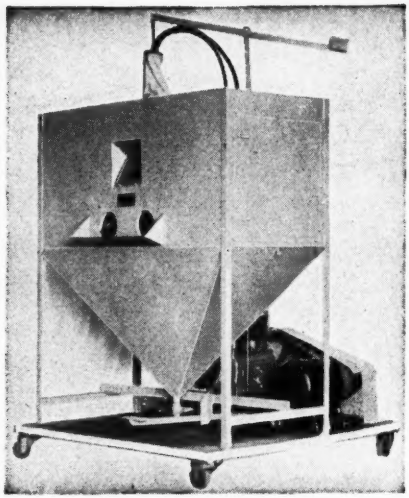
A cleaning machine manufactured by N. Ransohoff, Inc., 212 W. 71st St., Cincinnati, Ohio. This machine has been designed to wash chips from very fine holes which are drilled in carburetor and fuel pump parts. The outstanding feature of this machine is its ability to give each perforation the full benefit of at least two sprays of cleaning compound and rinse water at a 60 ft. head.

inishing Review---

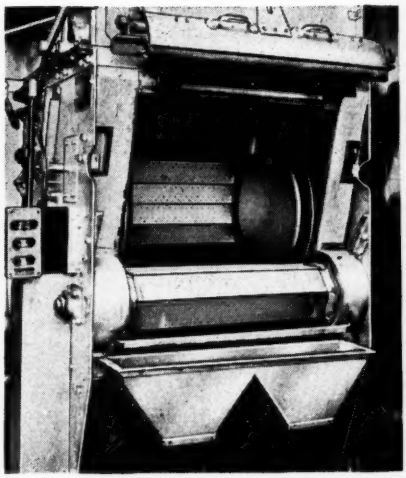


The Alvey-Ferguson Co., 75 Disney St., Cincinnati, Ohio, placed on the market a rotary drum type washing machine designed specifically for processing small cartridges. By means of this unit, the small cartridges can be washed, rinsed, soaped and dried.

The Metalwash Machinery Co., Inc., 27 Haynes Avenue, Newark, N. J., perfected a new machine for cleaning metals, that was of deep interest to manufacturers—especially to those engaged in National Defense work. A number of industrial plants are now using this model very successfully for cleaning fine finished screw machine parts which have delicate threads or surfaces that must not be marred or mixed in process of cleaning.

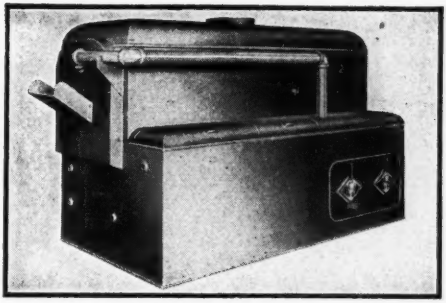


Shown herewith is the Leiman Type C Sandblast which was brought out by Leiman Bros., Inc., 101-W Christie St., Newark, N. J. The sandblast is suitable for large, bulky workpieces up to approximately 2 ft. square. A door is provided on each side of the machine for inserting the workpieces. The Leiman Type C Sandblast is designed for use with any abrasive such as sand, flint, or steel grit. The flow of the abrasive can be adjusted at the mixer cup where it is readily observed. Starting and stopping of the blast action is controlled by a foot treadle which turns the compressed air on and off. The Type C sandblast requires from 20 to 70 cu. ft. of compressed air per minute for operation.



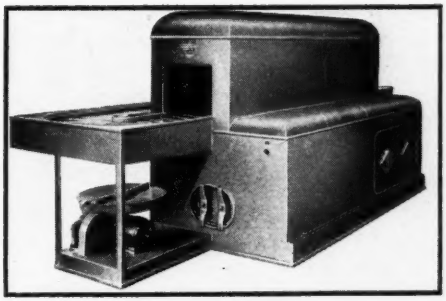
A double hopper trough feed which can be used in connection with a Wheelabrator Tumblast was placed on the market by American Foundry Equipment Company, Mishawaka, Ind. This double hopper trough feed is said to prevent spillage of small workpieces in removing the work from the tumblast unit after the parts have been blast cleaned.

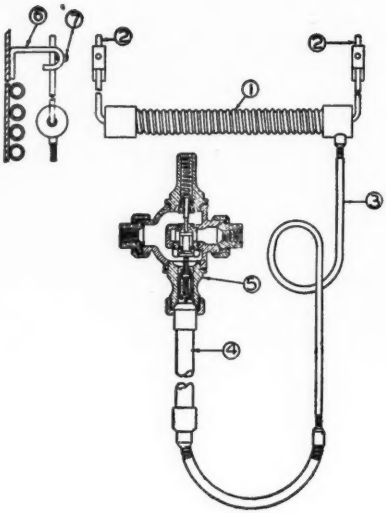
The International Conveyor and Washer Corporation, 640 E. Fort St., Detroit, Mich., developed and placed on the market a horizontal rotary type wash unit. The work processed in this unit is loaded into a hopper at one end and by means of a spiral in the perforated drum, it is moved to the exit end. Small flights fastened to the drum, pick up the work and turn it over and thus provide a means for the spray to cover the work from all directions.



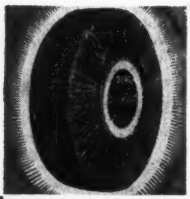
An outstanding development in the manufacture of power driven wheel brushes was announced by the Brush Division of The Osborn Manufacturing Company, 5401 Hamilton Ave., Cleveland, Ohio, manufacturer of Osborn Brushes. It is the Ringlock method of construction, which securely locks in the brush material by means of a one-piece ring and a sleeve. The design provides a dense brushing surface and reduces breakage of the brush material to a minimum.

A pallet type washing machine in which the conveyor returns work along one side of the machine instead of underneath was placed on the market by International Conveyor & Washer Corporation, 640 E. Fort St., Detroit, Mich. Parts to be washed can be loaded in tote pans and passed through the unit and returned to the same operator for unloading. These units are available built with wash, rinse, hot air blow-off, and some with final oil spray.





A vapor line control designed specifically to control the heating medium on degreasers has been placed on the market by Sarco Company, Inc., 183 Madison Ave., New York City. It is the function of this control to automatically maintain the correct vapor line regardless of variations in load and intermittent operation. According to the manufacturer, this saves solvent, prevents boiling over of vapors, and prevents the formation of rust in the degreaser.



POLISHING GRINDING WHEELS

Made of
WOOL — COTTON
LEATHER — CANVAS

EFFICIENT • LOW COST • PROMPT DELIVERY

ARROW DURA WHEEL, INC.
60 Grand Street New York City

Triton NE Detergent

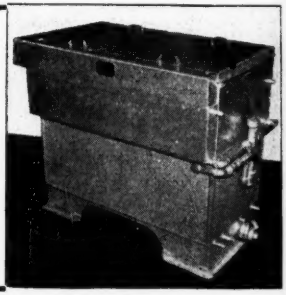
A synthetic, non-electrolyte detergent to be known as "Triton NE" was developed for metal-cleaning work by Rohm & Haas Company, 222 W. Washington Square, Philadelphia, Pa. This material is said to be a high molecular weight complex organic alcohol, nonionic and readily soluble, even in strong salt solutions. It is manufactured as a viscous, transparent, pale amber liquid.

DECREASE DEGREASING COSTS!

We can build a "D'OILER" (manual or automatic) to handle your degreasing jobs swiftly and economically. May we send you complete details?

You should use D'OILENE in your degreaser.

MECHANICAL PROCESS COMPANY
SOUTH ORANGE NEW JERSEY
Specialists in the use and handling of chlorinated solvents



Oakite Deodorant No. 1

Due to speeded-up manufacturing schedules and greatly enlarged personnel in many plants, the problem of maintaining proper sanitation standards in wash-rooms and related plant facilities to guard against infection and to protect employee health, became increasingly important to plant managers and maintenance superintendents.

Of timely interest was the development known as Oakite Deodorant No. 1, a triple-action material combining deodorizing, detergent and disinfecting properties which has been designed to simplify this problem by affording an effective means, in one operation, of carrying out sanitation routines more easily and within specified time and cost limits.

Prep-Wash

The Neilson Chemical Company, 6564 Benson St., Detroit, Michigan, recently formulated a new metal cleaning product to be marketed under the trade name of "Prep-Wash." This material is said to fit into the same classification of metal cleaners as Metalprep, Prep-Rite, and Galvaprep which are designed for cleaning and preparing metal surfaces for paint finishes.

Prep-Wash is a liquid material which can be used either hot or cold in water solutions. The amount of Prep-Wash added to the tank for the initial charge or for replenishment purposes is said to be nominal. The Prep-Wash material can be applied mechanically through suitable pressure type spray washing machine equipment. Standard alkali washing machines are said to be representative of the type of equipment in which Prep-Wash material can be handled.

The process of applying Prep-Wash is said to provide a chemical cleaning of the surface. The Prep-Wash material is said to react chemically with the metal surface in a manner to provide a more paint receptive surface. According to the manufacturer, Prep-Wash in either the concentrated or diluted form is non-flammable and none of the ingredients is lost through evaporation. The ingredients used in the Prep-Wash material are at the present time freely available and are not included in any list of critical items.

Imperial No-Wash Remover

A paint remover known as "Imperial No-Wash Remover" was placed on the market by Wilson-Imperial Co., 113 Chestnut St., Newark, N. J. This material is said to have excellent solvent power and permits removal of several paint coats with one scraping. No after washing is required and quick clean up with rags or steel wool is all that is necessary.

Mention PRODUCTS FINISHING when writing to advertisers.

"MAGIC" TACK RAGS
IMPROVE YOUR FINISH 100%

MAGIC TACK RAGS remove specks, lint and sand particles--- bring out that deep, smooth luster, produce a faultless surface for white or colored finish. Why use "home made" tack rags when you can buy MAGIC TACK RAGS at trifling cost! They are tackier, do not dry--- are dust-proof and spontaneous combustion proof. Packed in dozen and gross lots or more. Made only by the

Wm. A. Juergens Co.
4036-40 Lagrange Street,
Toledo, Ohio, U. S. A.
If your dealer does not carry Magic Tack Rags, write us for sample.

Gunk
SELF EMULSIFYING DEGREASING SOLVENT-CONCENTRATE

SOMETHING NEW! GUNK X-11

- A Superior Substitute for Trichlorethylene Degreasing.
- Cold Tank Process . . . Effective Scouring . . . Long Life.
- Present Tank May Be Converted With Shop Labor.

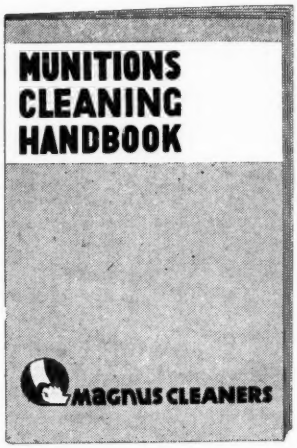
Ask your Jobber for GUNK or have him pick it up for you.

THE CURRAN CORP., Malden, Mass.

"The ABC and XYZ of Cleaning, Surfacing, and so on, by Controlled Abrasives" is a small and interesting handbook that was issued by The National Metal Abrasive Co., 3560 Norton Rd., Cleveland, Ohio. It treats rather exclusively on metal abrasives—abrasives of yesterday and those of today; types of abrasives; difference in action between shot and grit; how shot and grit are graded; great potential opportunities afforded by "controlled abrasives;" definite characteristics of abrasives to consider when buying abrasives; how to figure the price of abrasives you buy; craters caused by peening action of shot; sizes of shot and grit troubles and their cures; what you obtain by ordering, specifying and using National Controlled Abrasives—being the more important subjects.

Magnus Munitions Cleaning Handbook. The Magnus Chemical Company, Inc., manufacturer of industrial cleaning materials, emulsifying agents and metalworking lubricants, issued a new 36-page, illustrated Munitions Cleaning Handbook.

The handbook discusses in detail the cleaning problems met with in modern munition production. It covers cleaning operations in the manufacture of shells, shell cases, small arms ammunition, and fuses and fuse parts.



Magnus Munitions Cleaning Handbook

Another section of it covers the cleaning operations required in the production of ordnance, transportation equipment and other material which must be built to meet the complex and extensive demands of the Defense Program. The methods and materials discussed in this section are applicable in solving the cleaning problems encountered in any modern metal processing plant.

The handbook also devotes space to cleaning in maintenance and repair shops and the cleaning and protection of workers' hands and skin.

1-9-4-?

Some year the war will end.
Swords will be beaten back into plowshares, and golf clubs and refrigerators.
There will be a swing back into the things we buy because we like them and not because they are a grim necessity.
You are planning these things now, or should be.
Let us plan with you toward the finish for 194?, whenever it is.
We welcome any call for co-operation on long-range planning for the finish of the future.
Meantime, for 1942 and as far as we can see, we shall do our utmost to supply our customers with the best available materials and service permitted by wartime conditions.

The Varnish Products Co.
5208 Harvard Ave. Cleveland, Ohio

SOL-KLEAN
Before Paint
Makes Metal
So Clean
INDUSTRIAL CHEMICAL PRODUCTS CO.
DETROIT
Ft. Wayne **Milwaukee**

Oakite News Service. The important part that proper cleaning and surface preparation play in electrolytic resistance spot-welding of aluminum and its alloys in connection with aircraft production was described in an interesting two-page feature article appearing in the May-June issue of Oakite News Service, nationally distributed house magazine of Oakite Products, Inc., 20 Thames St., New York, New York.

Aviation Cleaning Handbook. The Magnus Chemical Company, Inc., 10 South Ave., Garwood, N. J., issued a new descriptive, illustrated 24-page booklet for aviation use.

The handbook thoroughly describes cleaning methods and materials for use in the maintenance of aircraft, airports, engine shops, and so on. It is written for all those concerned with safer, more efficient operation and maintenance of aviation equipment.

A few of the cleaning problems discussed in the aircraft section of the handbook are the cleaning of wings, fuselages, dismantled motors, prevention of sludge in motors and stripping finishes.

In the section devoted to cleaning operations in and around airport buildings and shops such problems as cleaning cement floors and runways, machinery, interiors of buildings, and cleaning and protecting workers' hands are discussed.

The Aviation Cleaning Handbook is attractively bound in aluminum and blue covers and makes a fine addition to one's reference file.

Mention PRODUCTS FINISHING when writing to advertisers.

BLACK for Iron and Steel

Original, low temperature, patented method

Superior
ABRASION-RESISTANCE
RUST-RESISTANCE
ECONOMICAL . . .FAST

Ask for details. Sample JETALized free.

ALROSE CHEMICAL CO.
PROVIDENCE, R. I.

DID YOU KNOW THAT

An unusually effective method for cleaning enameling clay is now being successfully employed?
See page 28.

Information regarding the special function of silica in metal cleaners will be sent free upon request?
See page 55.

Literature covering 32 items for the metal finishing plant or department is sent free to those who fill out a coupon?
See page 103.

A study of product and production and a demonstration of the features of a roof type oven installation will be made without obligation?
See Third Cover.

CUT DOWN REJECTS WITH ORVUS IN YOUR CLEANING AND PLATING BATHS

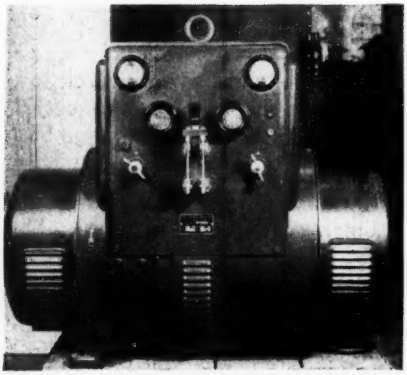
This sulfated fatty alcohol is EFFECTIVE

—as a surface tension lowering agent
—as an emulsifier
—in acid dips
—in rinsing after plating
—in reducing drag-out losses

Write for further information about Orvus to

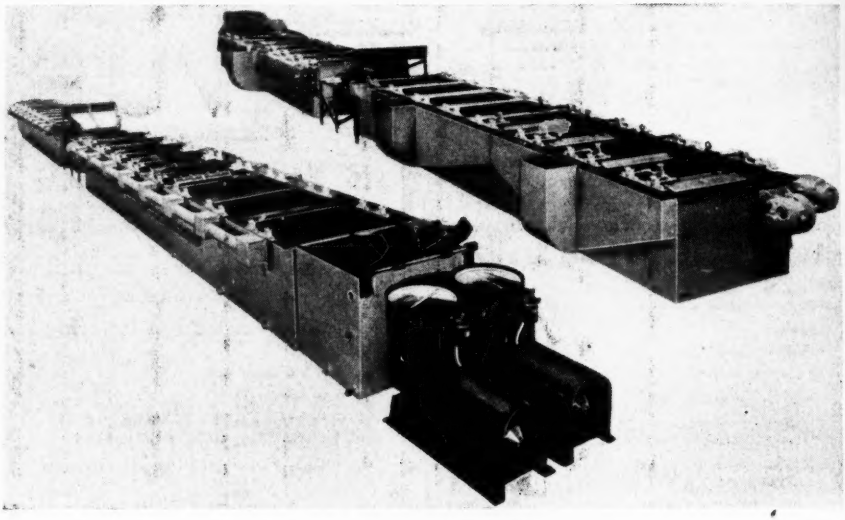
PROCTER & GAMBLE, Cincinnati, Ohio

PLATING

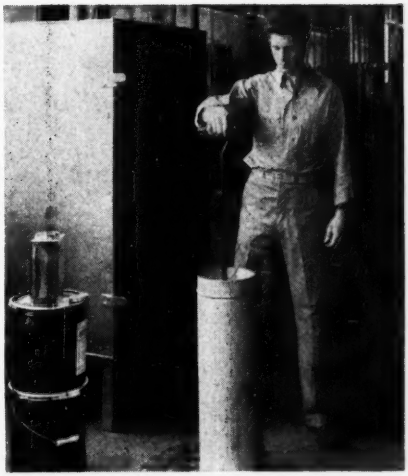


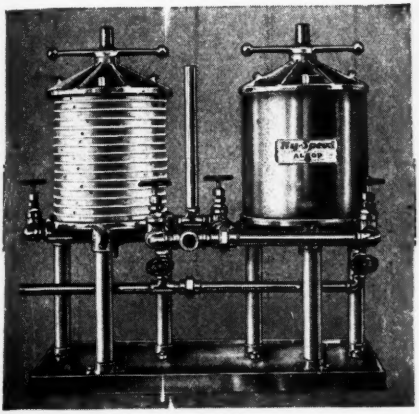
Motor Generator Corporation, Box PF 101, Troy, Ohio, announced a complete line of anodizing machines available from 125 through 875 amperes at 20, 40, or 50 volts D.C. Motor sizes range from 7½ through 55 h.p. generating from 5 to 35 KW. Each machine is furnished complete with control cabinet ready for anodic treatment of aluminum and its alloys whether the Alumilite, Bengough-Stewart, or Bureau of Standards process is used in the operation.

The Hanson-Van Winkle-Munning Co., Matawan, N. J., developed a Mercil type of equipment for washing, pickling, and rinsing 20 mm. shell casings after annealing. Installations were made by two well-known concerns. One of these installations had a Mercil type rotary cleaning unit with a loading compartment. This particular unit is motor driven. An exhaust hood was included for the cleaner tank, and steel cylinders were also included.



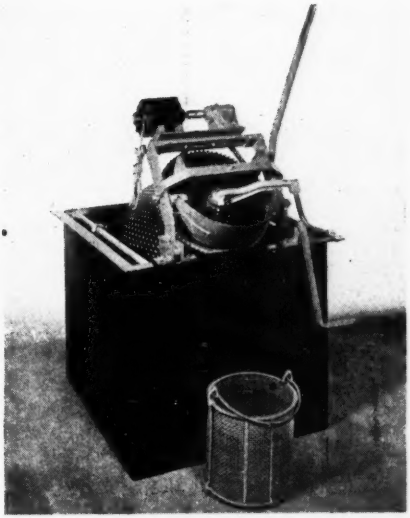
A protective coating material known as "Microplastic" was introduced by the Michigan Chrome & Chemical Co., 6340 E. Jefferson Ave., Detroit, Mich. This material, which provides chemical resistance to all acids and plating solutions, alkali cleaners and petroleum spirits, has characteristics which are said to have never before been offered in similar products.

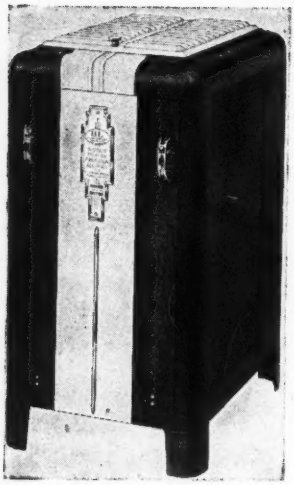




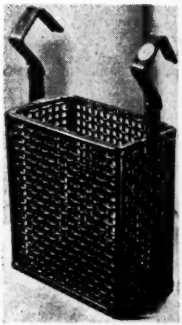
A large capacity filter for plating solutions and metal cleaning solvents in a multiple type was placed on the market by Alsop Engineering Corp., 1 Temple St., Milldale, Conn. The multiple filtering unit is an adaptation of the Alsop Hy-Speed principle of large filtering areas in comparatively small space.

The Udylite Corporation, 1651 E. Grand Blvd., Detroit, Mich., manufacturer of plating equipment and supplies, introduced a new barrel plating machine known as the "Multi-Purpose" Barrel. It may be used for a variety of purposes such as cleaning, drying, plating, rinsing, or pickling.

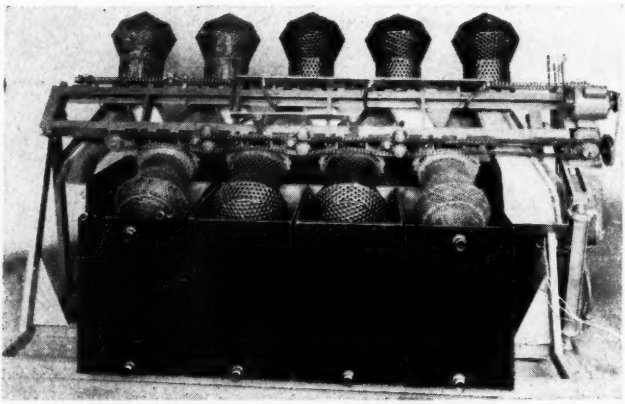




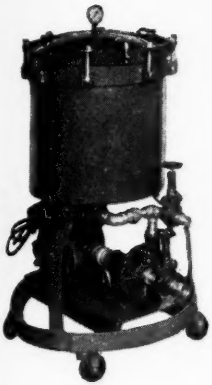
The Benwood Linze Co., 1850 Washington Ave., St. Louis, Mo., announced the addition of a B-L Dry Plate Rectifier for electroplating to its established line of rectifiers and rectifier equipment. They are compact and mobile. Models are available for 300 ampere and 500 ampere capacities, at 6 volts and 12 volts—operating from 230 volt and 440 volt, three phase, 60 cycle, a.c. service.



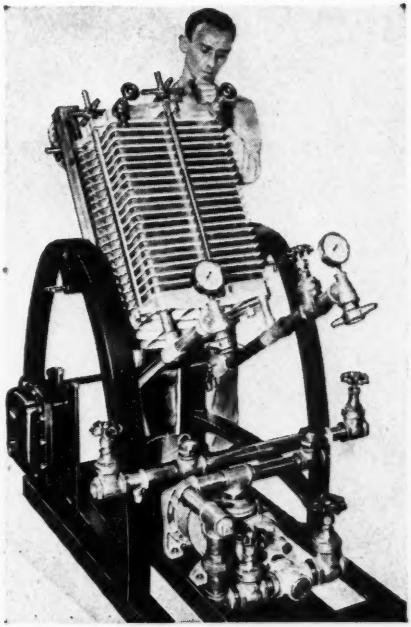
A new type of basket for handling scrap anodes was developed by the Hanson-Van Winkle-Munning Co., Matawan, N. J., manufacturer of electroplating equipment and supplies. The Hanson-Van Winkle-Munning rubber covered scrap anode basket is furnished with two hooks, allowing the basket to be hung on anode rods in still tanks and plating barrel tanks.



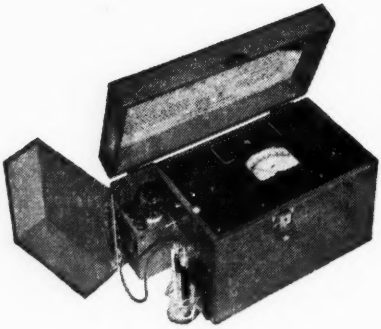
The development of a full automatic barrel cleaning and plating machine for handling small parts in bulk was announced by The Udylite Corporation, 1651 E. Grand Blvd., Detroit, Mich., manufacturer of plating and polishing machinery.



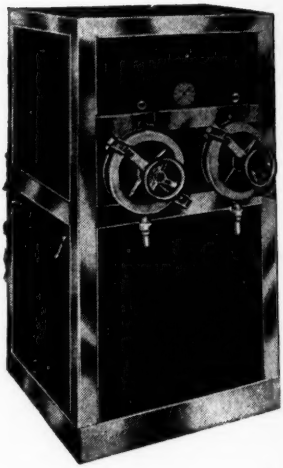
A horizontal plate filter unit for nickel, copper, brass, zinc, cadmium, silver, and chromium plating solutions was placed on the market by Sparkler Manufacturing Company, 1210 Webster Ave., Chicago, Ill. This acid and plating solution filter is engineered to make use of the modern diatomacious filter aids to the best possible advantage. Sparkler Filters are available in capacities ranging from 100 to 5000 gallons per hour. The unit is especially adapted for using activated carbon. It is completely enclosed, easy to clean, and occupies minimum floor space. Each unit is equipped with a splash proof motor.



The Seitz Flexmaster was placed on the market by the American Seitz Filter Corporation, Paterson, N. J. This unit is said to combine sheet and alluvial filtration, combine any kind of media, in the only filter that turns from horizontal to vertical operating position. The Flexmaster plates are 16 in. and 24 in. square. The maximum number is 20. The standard plates accommodate ½ in. thick filter layers, but special plates are available for 1 in., 1½ in., and 2 in. filter layers.



Though simplified and stripped to essentials for low cost and easy operation, the Glass-Electrode pH Indicator manufactured and marketed by Leeds & Northrup Company, 4934 Stenton Ave., Philadelphia, Pa., offered as much accuracy as is needed in many laboratory measurements and in practically all plant tests. It retains full accuracy up to 85 deg. F. in atmospheres of 95 per cent relative humidity.

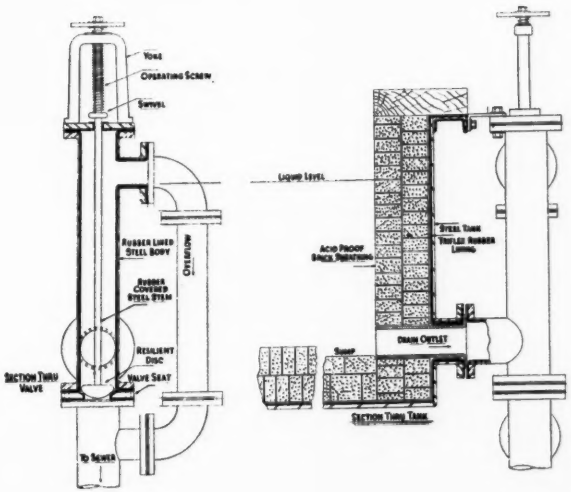


A fluid purifying unit designed to filter and clarify chlorinated and other dry fluids was placed on the market by Circle Machinery Corporation, 460 West 34th St., New York City. The units measures 27 in. wide, 50 in. high, and 34 in. deep.

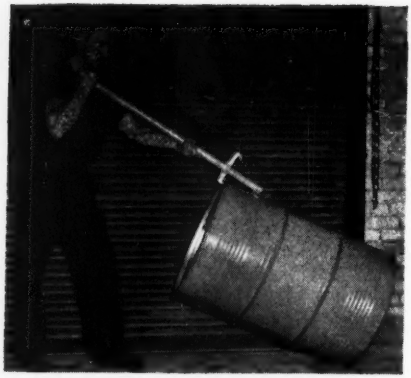
One of the surest and most fool-proof methods for determining pH is said to be possible by means of the quinhydrone model Kocour pH Meter which was placed on the market by Kocour Co., 4724 S. Christiana Ave., Chicago, Ill. The galvanometer used is very rugged and the suspension is not likely to be found snapped.

(Left) A ten corner lead anode for chrome plating to be known as the Multi-Edge was placed on the market by Republic Lead Equipment Co., 7924 Jones Road, Cleveland, Ohio. The ribs of the Multi-Edge anode are beveled to provide a higher degree of strength and rigidity, and reduce the tendency to curl.

(Right) A Chromalox Immersion Heater with thermostat control was placed on the market by Edwin L. Wiegand Company, 7500 Thomas Blvd., Pittsburgh, Pa. This immersion heater is recommended for sulfuric, hydrofluoric and fluoride solutions, sulfurous compounds, acid copper electroplating solutions, chromium electroplating solutions, and ordinary warm nickel electroplating solutions.

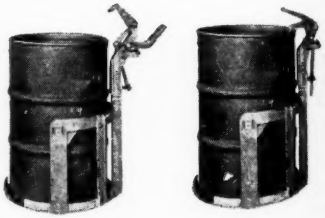


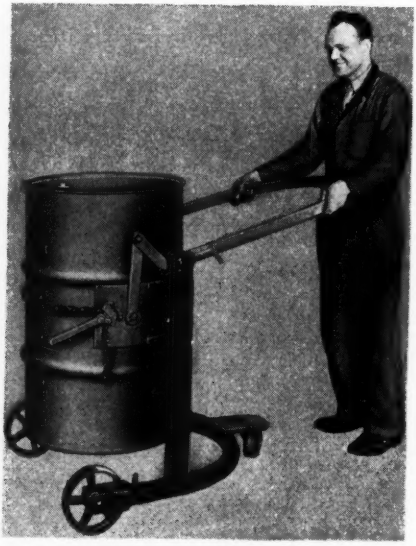
An improvement in the method of handling acids used in steel pickling operations was announced by The B. F. Goodrich Company, 450 S. Main St., Akron, Ohio, as a result of a development of a new combination outlet and overflow valve for these tanks. The new product is a modification of the patented rubber-lined Vulcalock valve developed by Goodrich for handling corrosive and abrasive fluids.



The Lewis-Shepard Sales Corporation, 295 Walnut St., Watertown, Mass., developed a device for the safe handling of barrels and drums. This simple but practical tipper consists of a strong handle with a pronged collar which is adjustable.

Lewis-Shepard Sales Corporation, 245 Walnut St., Watertown, Mass., presented a quick-locking harness to speed up and make more efficient the handling and dumping of barrels and drums.





The Falstrom Company, Main Ave., Passaic, N. J., placed on the market a heavy duty container handling device to be known as "Drum-Lift." This drum handling unit is said to provide the means for lifting, moving, rotating, and tilting most types of drums.

United Chromium Alkaline Copper Process

No special cleaning or activation prior to replating is said to be required with surfaces plated by means of a Unichrome Alkaline Copper Process which was placed on the market by United Chromium, 51 E. 42nd St., New York City. The Unichrome Copper Process is said to provide fine-grained smooth deposits. Surface is said to make excellent base for bright nickel and where buffing is required, results in easy flow and minimum wheel wear.

Hanson-Van Winkle-Munning Bright Copper Plating Process

A bright copper plating process, developed by Dr. Louis Weisberg, was placed on the market by the Hanson-Van Winkle-Munning Company, Matawan, N. J. Due to the shortage of nickel, many concerns have been contemplating applying heavy copper deposits followed by comparatively light nickel coatings as a means of saving nickel.

The basic ingredients of the bright copper plating solutions are copper sulfate, diethylene triamine, and ammonium sulfate. The copper is in the bivalent form.

Electrobrite

Increased smoothness and reflectivity of polished stainless and rustless steel is said to be obtained when a compound known as "Electrobrite" which was placed on the market by The Franklin Oil & Gas Co., Box 127, Bedford, Ohio, is added to the electropolishing bath. Use of the compound is said to allow reduction in current density and operating voltage of baths, and to eliminate foaming and fuming. Irregular or round shapes are said to be polished uniformly.

Electrobrite is available in various grades depending upon the current and temperature used and finish desired.

Electroplating Colalloy, Aluminum and Its Alloys

Joseph Steel, director of research of the Colonial Alloys Company, E. Somerset and Trenton Ave., Philadelphia, Pa., Chemicals Division, announced an easy method of commercially electroplating Colalloy, aluminum and aluminum alloys. This applies to all of the known alloys.

The process consists of a two to four minute dip in a solution known as "Preplate," which is furnished by the company. There is no electrolytic preparation necessary and the chemical solution is used at room temperature. After this dip, the product is ready for the regular plating bath. No special tanks or equipment are necessary. The size of the work is not a limiting factor.

BRING YOUR PROBLEMS
TO
FINISHING
HEADQUARTERS

McAleer is the source for **all** types of finishing materials. McAleer has laboratory facilities and technicians to solve special problems — develop new compounds.
Headquarters for sanding, rubbing and buffing compounds, tripoli, grease stick, rouge, white finish, emery cake and paste.

Distributors Valencia Pumice Powdered and Lump

McALEER
MANUFACTURING COMPANY
DETROIT, MICHIGAN

For a real good polishing job use
KEYSTONE EMERY
TURKISH — NAXOS — AMERICAN
KEYSTONE EMERY MILLS *Write for Sample* 4316 Paul St., Phila., Pa.

Triton 720

A synthetic detergent called Triton 720 and described as "an aqueous paste of a sulfonated ether salt" was placed on the market by Rohm & Haas Company, 222 W. Washington Sq., Philadelphia, Pa. It is said to be widely useful in the enameling and electroplating fields where stability makes it suitable for either acid pickling baths or alkaline cleaning solutions.

Electro-Jetalizing

A black, rust-proof finish for copper can be applied by means of the "Electro-Jetal" process which was placed on the market by Alrose Chemical Co., Providence, R. I. According to the manufacturer, any metal that can be copper plated can be blackened by Electro-Jetalizing.

After preplating with copper, products being treated are immersed in a special electrolytic oxidizing bath for two to five minutes. The resulting velvety black surface is an excellent absorptive base of an after treatment of oil, wax, or lacquer.

RUST-I-CIDE "50"

CLEANS METAL *Easily and Quickly*

REMOVES RUST

. . . and provides a foundation for good, lasting finishes.

RUST-I-CIDE '50'

★ Imparts better adhesion by mildly etching.

★ Gives longer life by preventing rusting from within.

★ Chemically cleans—dissolves and *removes* common shop accumulations.

★ Instantaneous action and low cost.

That's why so many companies working on defense orders are using RUST-I-CIDE

RUSTICIDE PRODUCTS COMPANY
Cleveland, Ohio

Hubbell-Weisberg Zinc Plating Process

A new method of electroplating steel products with zinc to be known as the Hubbell-Weisberg Process was placed on the market by the Hanson-Van Winkle-Munning Co., Matawan, N. J. This process will be of interest to manufacturers of wire, strip, and other metal products who can now use waste instead of new metals. The chief advantage of the process is said to lie in the utilization of cheap zinc instead of zinc anodes.

Brown Pickling Tank Temperature Control System

The Brown Instrument Company, Wayne and Roberts Aves., Philadelphia, Pa., placed on the market a temperature control system for pickling tanks which was designed not only to overcome the difficulties arising from corrosive conditions in the pickling room but to lend itself to ease of manipulation as well as accuracy in operation.

Electro-Ebonol

The Enthone Company, 440 Elm St., New Haven, Conn., announced a new process called "Electro-Ebonol" for electrolytic blackening of almost all metals, including aluminum, steel, stainless steel, zinc, cadmium, nickel, silver, gold, lead, tin, and various alloys. The manufacturers claim their process to be particularly important in view of the shortage of nickel salts for black nickel solutions. The Electro-Ebonol deposits are stated to be harder, blacker, and more adherent than black nickel.

ROBERTS Says: **DIGGING THAT GETS RESULTS.** Send us your hard jobs. If it's a rush order, a little extra service or something out of the ordinary you need, we'll go all the way to give you satisfaction.

THE ROBERTS ROUGE CO., Specialists in manufacturing thoroughly dependable Gold, Sterling and Silver Plate Rouges; Stainless Steel, Chrome and Crocus Compounds. STRATFORD, CONN

Electro-Ebonol salts are supplied ready for use and a solution of 12 oz. per gallon of water is used, operated from 140 to 190 deg. F. Current densities required are low, ranging from ½ to 5 amperes per square foot. Voltage, from 1 to 2, depending upon the setup. Anodes may be of carbon, or stainless steel. Tanks may be of wood, stainless steel, ceramic ware, or Monel metal.

The work is cleaned for blackening similar to the cleaning preceding plating and the black coating is deposited very rapidly, in from 30 seconds to three minutes, depending upon current density. The throwing power is claimed to be very high, better than any metal plating solution. Parts will be blackened by the manufacturer for examination or test.

King Plating Barrel Catalog. White Oak Machine Woven Plating barrels manufactured and marketed by John King & Sons, 48 Springfield St., Dayton, Ohio, are described in a catalog which was issued by the company. The woven plating barrel does not rattle the work but is said to gently and positively agitate it. The cover is made flat so that in each revolution the work is completely rearranged. The inside contacts can easily be removed, cleaned, and replaced.

Flat work will not cling or stick to the uneven surface of the barrel thereby eliminating all streaks, spots, and burns. A closely woven barrel is provided for small workpieces. An open weave is available for the general run of work.

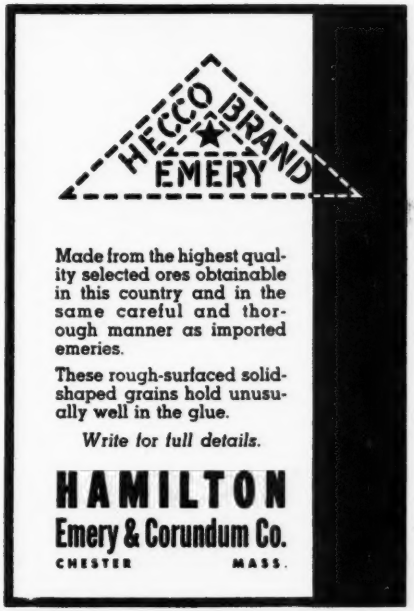
There are 34 points of agitation in the 16-in. diameter King Plating Barrel. The recommended speed is 1½ to 2 r.p.m.

High caustics and high cyanides with a hot solution does not affect the barrel. According to the manufacturer, a maximum amount of metal can be deposited in a minimum of time. The barrel can be operated with any type of inside and outside contacts.

Brown System for Plating Tanks. The Brown Instrument Company, Wayne and Roberts Aves., Philadelphia, Pa., issued a bulletin describing a new system of instrumentation for plating tanks. This system fundamentally involves direct control of the temperature pipe coils or water jacket rather than indirect control of the circulating water from the temperature of the plating solution.

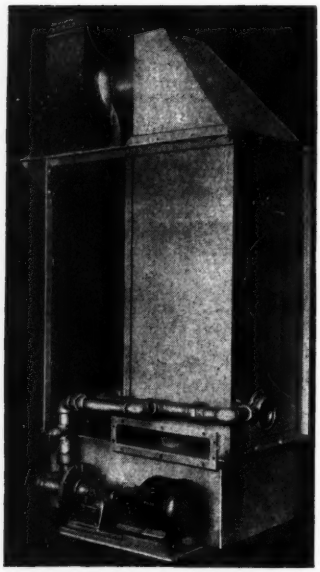
The electrode deposition of metals such as chromium, copper, nickel, cadmium, and so on, is more effectively and economically accomplished if the plating solution or bath is maintained at a temperature consistent with the desired conductivity or "throwing power" of the solution.

Mention PRODUCTS FINISHING when writing to advertisers.

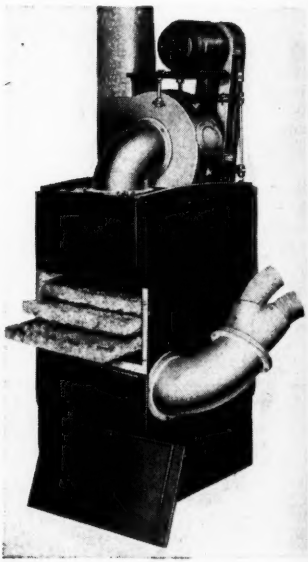

HECCO BRAND
EMERY
Made from the highest quality selected ores obtainable in this country and in the same careful and thorough manner as imported emeries.
These rough-surfaced solid-shaped grains hold unusually well in the glue.
Write for full details.
HAMILTON
Emery & Corundum Co.
CHESTER MASS.

WRITE FOR LATEST CATALOGUE ON
NEW LOW COST PLATING
with MGC Electroplating Equipment
MOTOR GENERATOR CORP., Box PF-12 Troy, Ohio, U.S.A.

POLISHING

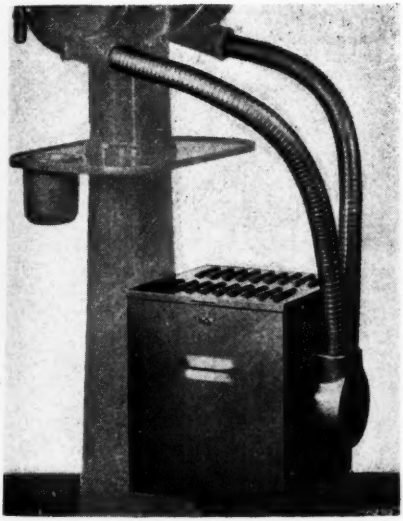


The Hydro-Whirl Dust Collector developed by the Industrial Sheet Metal Works, 630 E. Forest Ave., Detroit, Mich., marked a notable advance in industry, since it removes all of the hazards that have attended the processing of magnesium and its alloys. Manufacturers can now feel more secure in using this material to a greater degree than they ever have before.

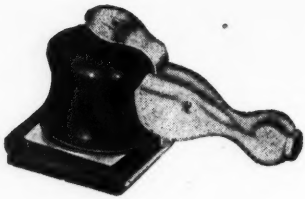


The Hisey-Wolf Machine Co., 2745 Colerain Ave., Cincinnati, Ohio, placed on the market a combination exhauster and filter for polishing and buffing machines. Dust laden air enters a cyclone collector removing coarse particles and, after passing through impingement-type filters which arrest the fine dust, is said to be so clean that it can be recirculated in the room after leaving the fan of the unit. The motor is externally mounted, thus assuring cool and clean operation.

A machine for use in shaping, sanding, and polishing plastic and metal was placed on the market by Mead Specialties Co., 15 S. Market St., Chicago, Ill. The machine, which is known as the "Bandmaster," is said to cut fast and clean on curves, inner edges, and so on.

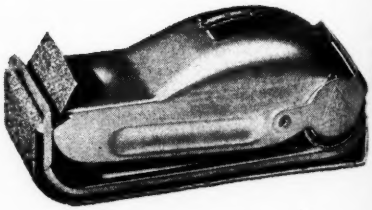


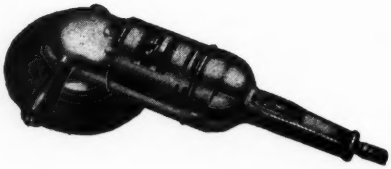
A unit type dust collector known as the "Dustkop 600" was placed on the market by Aget Manufacturing Co., 424 Book Bldg., Detroit, Mich. This dust collecting unit has a 600 c.f.m. rating and is designed to exhaust one or more pedestal or bench type polishing and buffing machines. Being entirely self-contained and not requiring connecting in with a centralized collecting system, the Dustkop 600 is said to permit rapid installation and subsequent moving of the machine and collector as a unit.



Air operated for safety and incorporating a non-stalling motor, the air sander shown in the illustration herewith, product of National Air Sander, Inc., 2710-12 W. State St., Rockford, Ill., is adaptable for wet or dry sanding operations in all types of finishing.

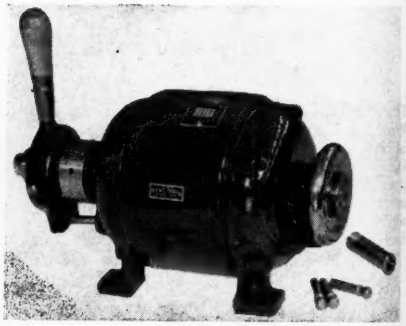
The illustration shows the Model 12-A Speed-Wet Sander which was placed on the market by Behr-Manning, Troy, N. Y. The sander is designed to fit the hand and may be used for dry sanding or with water, gasoline, or oil. The unit is constructed in such a manner as to hold a length of abrasive paper or cloth tightly in position over a replaceable Neoprene pad, and is recommended for sanding flat or slightly curved surfaces.

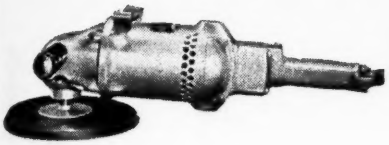




A heavy duty, powerful sander designed for all types of production and repair work was announced by Stanley Electrical Tool Div., The Stanley Works, New Britain, Conn. The mechanical refinements of the sander combined with the compact design make available a long-life tool for fast, efficient sanding, buffing, and surfacing on wood, metal, and concrete.

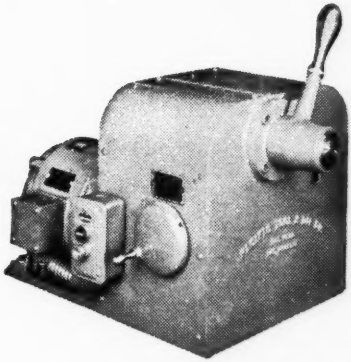
Realizing the need, with stepped-up production demands, to free precision bench lathes for other uses, the C. W. C. Corporation, Hawthorn, Calif., placed on the market the Speedy Polishing Lathe shown in the illustration. The lathe is designed to finish turret lathe products, remove tool marks, polish round parts, as well as for lapping and burnishing.

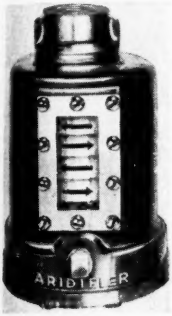




Designed for constant production-line use with 9-in. abrasive discs, the heavy duty sander illustrated was brought out by The Black & Decker Mfg. Co., 720 Joppa Rd., Towson, Md. The unit is said to be ideal for use with wire cup brushes and saucer grinding wheels for right-angle grinding.

A polishing and buffing lathe with an infinite number of variable spindle speeds from 1,250 to 5,000 r.p.m. known as the Pacific Vera-Lathe was placed on the market by Pacific Tool & Die Co., 1225 E. 63rd St., Los Angeles, Calif. This unit is said to be equipped with a hollow spindle design and a novel collet operating mechanism.





A portable, self-contained dust collecting unit for polishing and grinding wheels was placed on the market by Torit Manufacturing Co., 289 Walnut St., St. Paul, Minn. The Torit Dust Collector can be placed wherever convenient near the grinding or polishing wheel.

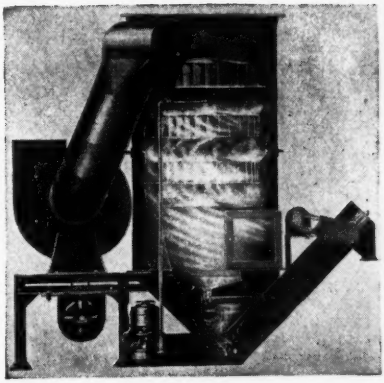
The Stanley Electrical Tool Division, The Stanley Works, New Britain, Conn., developed two portable electric polishers for the cleaning and polishing of metal and removal of stains or heat tint caused by welding. Designated as the Nos. 182 and 187, the polishers are slow speed (600 r.p.m.) units for which proper brushes and compounds have been developed for maximum efficiency.

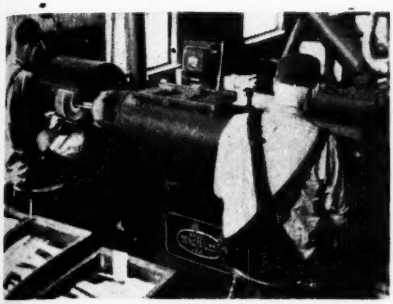
The miniature Dupor No. 1 nuisance dust respirator announced by H. S. Cover, 1931 Chippewa, South Bend, Ind., was made even lighter through the use of molded plastic valves. The total weight of the entire unit is said to be now reduced to well under one ounce.

Weldon Roberts Rubber Co., Newark, N. J., placed on the market a line of "Brightboy" Discs, Lathe Wheels, and Tablets for finishing, pre-finishing, polishing, and pre-polishing metals. Brightboy is a rubber-eraser compound impregnated with abrasive. The soft rubber binder cushions the abrasive and gives to Brightboy a utility which lies between that of a light grinding wheel and a buff.

An improved soft rubber polishing wheel by means of which highly polished surfaces can be rapidly produced on any base metal was announced by the Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Dept. MM, Chicago, Ill.

The Claude B. Schneible Co., 3951 Lawrence Ave., Chicago, Ill., announced a unit dust collector in 2,000 to 10,000 c.f.m. capacities. Designated as the Type "UC," the collector consists of a fan, five-spray curtain tower, pump, settling chamber, and sludge ejector-conveyor.



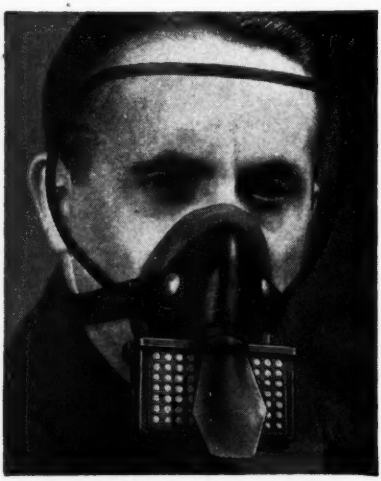


An adjustable and selective speed model polishing and buffing machine was placed on the market by Bruce Products Corporation, 5712 12th St., Detroit, Mich. The wheel spindle bearings of the unit are of high capacity, precision type, full floating mounted, and effectively enclosed to eliminate leakage of lubricant and entrance of abrasive dust.

The Jefferson Machine Tool Co., 750 W. Fourth St., Cincinnati, Ohio, placed on the market an endless belt sander which is said to eliminate costly hand sanding and finishing. Large, flat, as well as concave or convex surfaces on metal can be finished in the same manner as hand work, but with lightening speed. The flexible sanding belt of the Jefferson Endless Belt Sander, is said to respond quickly to the operator's touch.

A compact glue heater, fabricated with a heavy steel cabinet at the top of which is assembled an insulated, non-ferrous metal water reservoir in which the glue pails are suspended was placed on the market by Rome Machinery Sales & Engineering Co., 627 Webster St., Rome, N. Y. A suitable frame, above the reservoir, supports each glue pail in its respective position.

The Torit Manufacturing Co., 296 Walnut St., St. Paul, Minn., marketed a cyclone-type dust separator for collecting dust from grinding and polishing wheels. The unit available for use with or without filter bag collectors and draws dust-laden air from hoods surrounding polishing, grinding wheels, etc.



Mine Safety Appliances Company, Braddock, Thomas and Meade Sts., Pittsburgh, Pa., announced a M. S. A. Dustfoe-Eyeshield Assembly and Comfo-Eyeshield Assembly. These units are said to furnish respiratory protection against invisible particles of harmful dust, and guard the wearers' eyes from flying dust and grit by a light, durable, transparent plastic shield.

Ad-Lea-Sive

A blended glue-base adhesive to be known as Ad-Lea-Sive was placed on the market by The Lea Manufacturing Co., 22 Cherry St., Waterbury, Conn. According to the manufacturer, this material can be used as a substitute for polishing wheel glue in which it is used not only for precoating the wheel but also for bonding the grain to the wheel.

Hanson-Van Winkle-Munning Stainless Steel Polishing Compounds

A line of rouges and other compounds for polishing stainless steel was developed and is now being marketed by the Hanson-Van Winkle-Munning Company, Matawan, N. J. An outstanding constituent of these polishing compounds is said to be a special levigated alumina flour.

Grainlock Sizing Cement

Industrial Lubricants Co., Inc., 5736 12th St., Detroit, Mich., placed on the market a Grainlock Sizing Cement for use on polishing wheels. Grainlock Sizing Cement was developed primarily for use with Grainlock polishing wheel cement, as a primer or base upon which to apply cement. The sizing is worked thoroughly into the wheel, first against the nap and then in the opposite direction.

National Controlled Abrasives

The National Metal Abrasive Co., 3560 Norton Rd., Cleveland, Ohio. manufactured and marketed steel shot and grit known as "Controlled Abrasives." By means of a special process, this company is processing shot and grit in such a manner to produce the best degree of toughness and hardness in relation to the size.

Schauer Speed Lathes. Schauer Machine Co., 2060 Reading Rd., Cincinnati, Ohio, issued a 24-page illustrated circular, designated as the No. 400, which illustrates and describes the Schauer complete line of high production, bench and pedestal speed lathes especially designed for finishing, polishing, burring, or lapping small parts. The line includes standard series units as well as new variable-speed lathes and lathes with vacuum-type holding fixtures.

Dust Control. A complete story of dust control in words and pictures by means of Roto-Clone dust control equipment was issued by American Air Filter Company, Inc., 702 Central Ave., Louisville, Kentucky.

Mention PRODUCTS FINISHING when writing to advertisers.

RECOVERED TALLOW

An excellent Tallow reclaimed from Harness Leather. This product is unusually high in heat resistance, due to the absorption of the natural chemical properties contained in harness leather.

Write for samples and quotations.

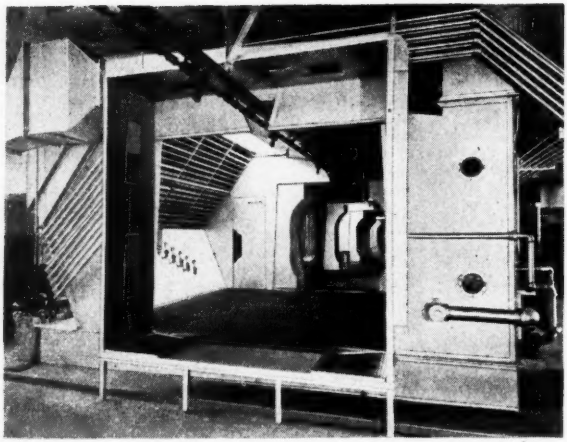
M. ROSS MASSON COMPANY
Dept. P.F.
2160 Montcalm St., Indianapolis, Ind.

For
Abrasive Paper and Cloth
Grinding Wheels
Sand Blast
Minus 300 Mesh for
Polishing and Lapping
Grades for Barrel Finishing

Ample Stocks Insure
Prompt Shipment

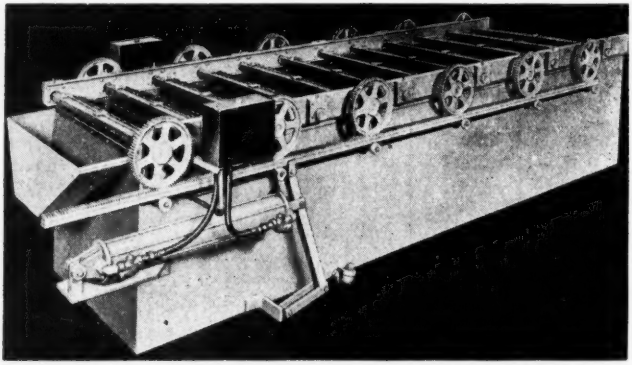
BARTON
MINES CORPORATION
NORTH CREEK, WARREN COUNTY, N. Y.

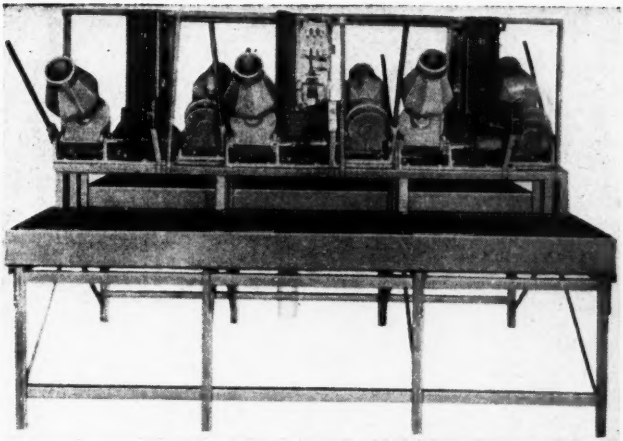
FINISHING



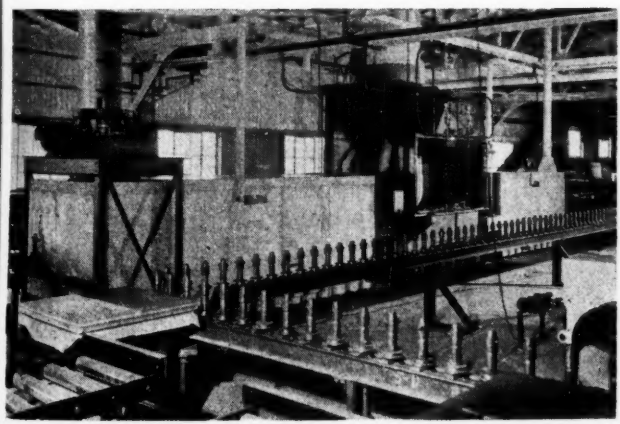
An unusual principle in a spray booth construction was incorporated in the new Hydro-Whirl developed by Industrial Sheet Metal Works, 630 E. Forest Ave., Detroit, Mich. The unit may be used singly or as a part of a continuous setup of booths. In the latter fashion, the arrangement is staggered and so constructed as to allow no possibility of "over-spray."

The Udylite Corporation, 1651 E. Grand Blvd., Detroit, Mich., manufacturer of plating and polishing equipment and supplies, announced the development of a new automatic Parkerizing machine capable of processing large quantities of small parts. It is said that this machine is ideal for those manufacturers who have large national defense contracts involving the production of .30 and .50 calibre steel machine gun links, Garand rifle clips, miscellaneous machine gun parts and other small parts which require the Parker finish.

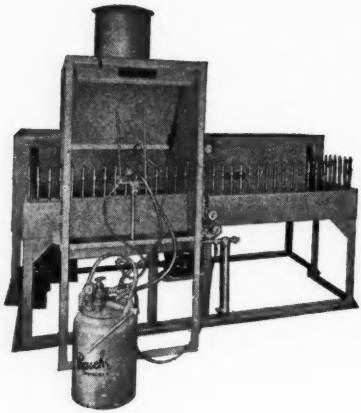




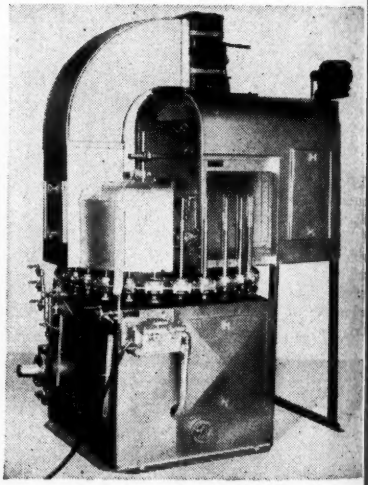
A new Mercil type of equipment for tumbling or cutting down machine gun parts was offered by Hanson-Van Winkle-Munning Company, Matawan, N. J. Before these machines were developed, the burrs on the machine gun parts were removed by filing by hand. This barrel is said to give a much better finished product than does hand filing.



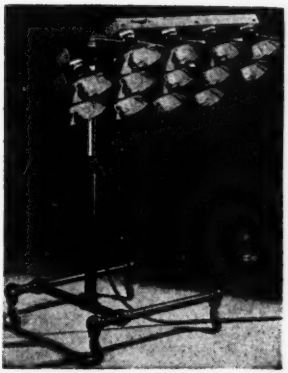
Automatic spray painting equipment manufactured by Binks Manufacturing Co., 3112 Carroll Ave., Chicago, Ill., is now being used to coat the outside of shells, in sizes ranging from 20 mm. to 105 mm. at the rate of 1,000 an hour in several large shell loading plants of the United States Government Ordnance Department.



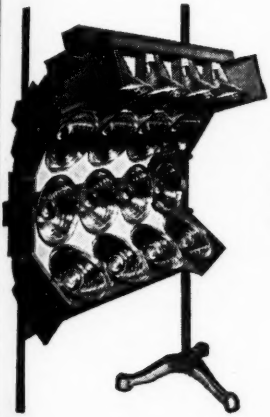
The accompanying illustration shows an Automatic Airfinishing and Drying Unit for application of black paint to 20 mm. shells at a rate of 17,000 per 8-hour day, which was placed on the market by Paasche Airbrush Co., 1910 Diversey Pkwy., Chicago, Ill. The unit includes special automatic aircoating and drying unit approximately 8 ft. long by 3 ft. 9 in. wide, equipped with steel roller chain, supporting 164 revolving spindle assemblies, automatic off and on control for airbrushes, varying speed pulley and reducer to operate the chain at speeds of 4 to 9 lineal feet per minute, all mounted to structural steel frame, electrically welded.



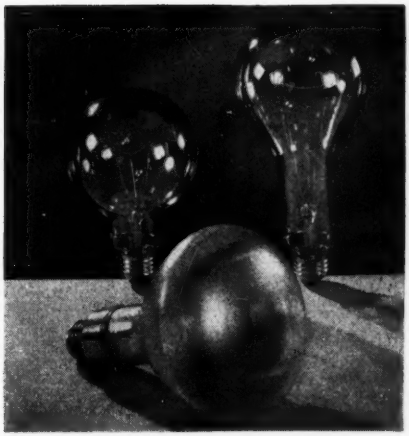
The painting of projectiles from 37 mm. up to 155 mm. can be handled automatically with a special machine developed by the Eclipse Air Brush Co., Inc., 400 Park Ave., Newark, N. J. The machine is shown in the illustration and consists of a 7 ft. indexed turntable with 36 rotating spindles which carry the shells in front of automatic spray guns that are synchronized with the turntable.



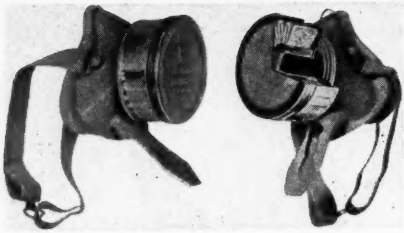
A portable infra-red ray unit designated as the "Nalco No. 13" lamp unit for radiant energy baking, heating, drying, and dehydrating was placed on the market by North American Electric Lamp Company, 1020 Tyler St., St. Louis, Mo. This portable unit is mounted on casters and can be easily moved into any desired position. The "Nalco 13" lamp unit can be tilted to any angle and may be swung over into a vertical position as well as the horizontal.



The Wilson "Patent-Flex" Universal Infra-Drying Tunnel, now being marketed by Wilson Lighting, Inc., 152 W. Erie St., Chicago, Ill., was said to be a vitally new, entirely different idea in construction and design, that combines the features of a permanent installation into a 100 per cent adjustable unit.

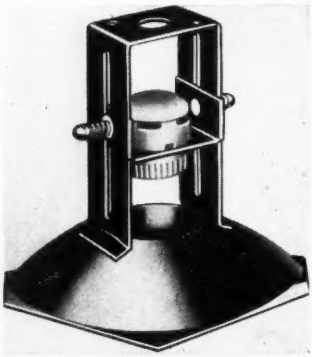


Three infra-red heat lamps were placed on the market by Birdseye Division of Wabash Appliance Corporation, 345 Carroll St., Brooklyn, N. Y. Two of the lamps are clear, for use with standard gold-plated or Alzac reflectors, and the third does not require any separate reflector since it is constructed with its own reflector lining sealed inside to keep it free from oxidation and the collection of dust, dirt, and fumes.

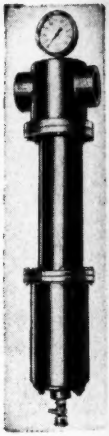


A respirator designated as the "MSD" which is said to afford maximum protection against the inhalation of pneumoconiosis-producing and nuisance dusts was placed on the market by The DeVilbiss Company, 300 Phillips Ave., Toledo, Ohio.

W. R. Brown Corporation, 5720 Armitage Ave., Chicago, Ill., announced a spedy sprayer model to be known as the No. 890. The light duty, pressure feed, material tank shown in the illustration was placed on the market by Paasche Airbrush Co., 1910 Diversey Pkwy., Chicago, Ill.



A hexagonal shaped reflector for infra-red baking known as the "Para-Sphere" was placed on the market by The Fostoria Pressed Steel Corporation, Fostoria, Ohio.



A centrifugal separating unit for removing water, oil, dirt, scale or rust from compressed air, gas, or steam, to be known as the "Textite" Separator, was placed on the market by Chicago Manufacturing & Distributing Co., 1928 W. 46th St., Chicago, Illinois.

A cleaning compound for removing rust, water stains, dirt, drawing compounds, and so on, to be known as "Rusticide 50" was placed on the market by Rusticide Products Co., 3125 Perkins Ave., Cleveland, Ohio.

The announcement by the Sherwin - Williams Company, Cleveland, Ohio, of a new, fast synthetic enamel for machine tool castings was of interest to manufacturers who are either not set up for lacquer work or who need a more resistant finish.

An efficient and accurate testing machine for evaluating resistance of surface finishes to rubbing abrasion known as the Research Model Taber Abraser was placed on the market by Taber Instrument Company, 113 Goundry St., North Tonawanda, N. Y. This machine can be used on surface finishes such as paints, lacquers, and electroplated coatings.

Roxaprene

A timely answer to the problem of impeding corrosion was given by Roxaline Flexible Lacquer Company, Box 716, Elizabeth, N. J., in the material known as "Roxaprene," a corrosion resistant speed synthetic. Roxaprene can be applied as a paint finish in general use by dip, spray, or roller coat, thus requiring no special equipment for application. It air dries quickly or may be force dried. This enables a considerable reduction in handling.

Watson-Standard Heat Resisting White Finish

A high heat resisting white finish designed as a coating for metal objects which in use are subjected to temperatures of from 400 to 500 deg. F. was placed on the market by The Watson-Standard Co., 225 Galveston Ave., Pittsburgh, Pennsylvania.

Maskote Enamel

The U. S. Chemical & Lacquer Co., 16710 E. Nine Mile Rd., East Detroit, Mich., placed on the market a protective coating to be known as Maskote Enamel. Maskote Enamel is designed to provide a protective coating for the back of articles to be electroplated for the purpose of saving nickel or other electrodeposited metals.

Wilbur & Williams Light Gray Totrust No. 30

As a substitute for aluminum paint, The Wilbur and Williams Company, Park Square Bldg., Boston, Mass., marketed a material known as Light Gray Totrust No. 30.

Thur-Ma-Lox High Heat Resisting Coatings

High heat resisting coatings which resist temperatures up to 1,600 deg. F. were placed on the market by Thurmalox Co., 3109 N. Broad St., Philadelphia, Pennsylvania.

Spec Cyanide Antispot

A cyanide antispot for preventing spotting out during hot and humid weather was placed on the market by Special Chemicals Corporation, 30 Irving Place, New York, New York.

Metalbond

A process for rust-proofing metal known as Metalbond, was placed on the market by International Rustproof Corporation, 12507 Plover Ave., Cleveland, Ohio.

Alrose Bon White

The Alrose Chemical Company, Providence, R. I., announced Bon White, a new immersion tin finish, applicable to all copper and brass surfaces.

Kem Save-Lite

A synthetic mill white which is said to cover with one coat and dry overnight to a hard tile-like surface was placed on the market by The Sherwin-Williams Company, 101 N. W. Prospect Ave., Cleveland, Ohio. This finish is recommended for plants where unusual conditions require maximum durability, fast drying, and extremely sanitary washable surfaces.

WE RECOVER YOUR
SOLVENTS and THINNERS
from Sludge, Waste, Wash,
Spoiled Lacquers, etc.
AND SAVE YOU MONEY
Each shipment—one drum or a carload—receives PROPER and SEPARATE TREATMENT.
Write to:
SOLVENTS RECOVERY SERVICE, Inc.
LISTER AVE. & BROWN ST., NEWARK, N. J.
or
HAMMOND CHEMICAL SERVICE, Inc.
241 BRUNSWICK ST. HAMMOND, IND.

TANK SLUDGES ARE VALUABLE
We will purchase Tin—Cadmium—Tungsten—Molybdenum sludges and residues.
Any quantity.
Send samples—Will quote promptly.
Also buyers of all grades of plating room scrap.
Metallurgical Products Co.
Established 1909
Converters—Reclaimers—Processors
35th and Moore Sts. Philadelphia, Pa.

Excelchrome Aluminum Enamel

A series of three aluminum finishes for finishing steel, copper, brass, iron, and galvanized metal known as Excelchrome A, B, and C were placed on the market by The Excelsior Varnish Works, Inc., 1228 W. 74th St., Cleveland, Ohio.

Tygon Corrosion-Resistant Paint

"Tygon" paint was the latest item to be announced by The United States Stoneware Co., P. O. Box 350, Akron, Ohio, as a companion product to "Tygon" linings.

Pemco Low-Firing Porcelain Enamel Frits

The Porcelain Enamel & Mfg. Co., Eastern and Pemco Aves., Baltimore, Md., placed three low-firing porcelain enamel frits on the market known as "Bontite," "Paradox," and "Resistayn."

M & W Coprene Enamels

A line of synthetic enamels that are said to air dry hard in twenty-four hours were marketed under the trade name of "Coprene," were developed by Maas and Waldstein Company, 438 Riverside Ave., Newark, N. J. These finishes have a chlorinated-rubber base and become very hard overnight under normal application conditions.

Houghto-Black

A blackening process for steel parts which can be rapidly applied, known as "Houghto-Black," was placed on the market by E. F. Houghton & Co., 240 W. Somerset St., Philadelphia, Pennsylvania.

Rowe Nylene

A white synthetic enamel known as "Nylene" was placed on the market by C. L. Rowe Corp., 152 Banker St., Brooklyn, New York.

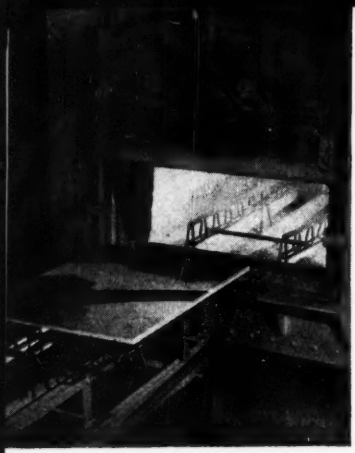
Opportunity Section

WANTED

Plating Room Superintendent

Must know copper, nickel, chromium and cadmium plating and chromic and sulphuric anodizing. Also able to analyze and control solutions and do experimental laboratory work. Must not be engaged in defense work or eligible for military service. A progressive, national mid-western firm. Address Box 47:

PRODUCTS FINISHING
431 Main Street Cincinnati, Ohio



FOR YOUR Catalog LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Industrial Instruments for Plating Operations

Concise descriptions of Foxboro Instruments designed for use in the plating department are described in an eight-page catalog now being issued by The Foxboro Company, Foxboro, Mass.

2. Improved Processing

The Selas Company, Erie Ave. near D St., Philadelphia, Pa., is now issuing a 14-page catalog explaining direct radiant gas heat at work for the metals and metal products industry.

3. Portable Cleaner

A portable cleaner designated as "3 in 1" for cleaning of dust, grit, filings, and turnings is described in a folder now being issued by Ideal Commutator Dresser Company, 1031 Park Ave., Sycamore, Illinois.

4. Milton Roy Chemical Pumps

A complete, informative catalog and a real aid in the selection and purchase of chemical and proportioning pumps is now being issued by Milton Roy Pumps, 1300 E. Mermaid Ave., Chestnut Hill, Philadelphia, Pennsylvania.

5. Industrial Styling with Color

A beautifully illustrated catalog depicting advertisements which have appeared in various magazines on Pittsburgh Industrial Finishes is now being issued by Pittsburgh Plate Glass Co., 2121 Grant Bldg., Pittsburgh, Pennsylvania.

6. The Airless Wheelabrator

The question "What Is the Airless Wheelbrator and What Will It Do?" is the title of a 16-page booklet now being published by the American Foundry Equipment Co., 621 S. Byrkit St., Mishawaka, Indiana.

7. Industrial Washing Machines and Conveyors

A folder telling how seven famous companies solved their product washing problems is now being issued by The Alvey - Ferguson Company, 75 Disney St., Cincinnati, Ohio.

8. Automatic Temperature Control in Electroplating Processes

A six-page folder illustrating and describing installations of automatic temperature control in plating operations is now being issued by The Foxboro Company, Foxboro, Massachusetts.

9. Park Finishing Bulletin

A 4-page bulletin describing polishing, rubbing, and buffing compositions, and Kold Grip Grain Cement is now being issued by Park Chemical Company, 8074 Military Ave., Detroit, Michigan.

10. Dust Respirator
A lightweight, compact, and efficient dust respirator designated as the "MSD" is described in a 4-page folder which is now being issued by The DeVilbiss Company, 300 Phillips Ave., Toledo, Ohio.

11. Chromium Chemicals
The uses and technical properties of chromium chemicals are described in a booklet which is now being issued by Mutual Chemical Co. of America, 270 Madison Ave., New York City.

12. Finishing Suggestions
"Finishing Suggestions on Metal That Will Reduce Costs" is the title of a 6-page folder which is now being issued by Sundstrand Machine Tool Co., 11th St. and Harrison Ave., Rockford, Ill.

13. New Wrinkles in Finishing
Vol. 3, No. 3 of this publication contains 12 pages of pertinent information on the application of Wrinkle Finishes marketed by New Wrinkle, Inc., Mutual Home Bldg., Dayton, Ohio.

14. Du Pont High Speed Brass
The Electroplating Division of E. I. du Pont de Nemours & Company, Wilmington, Del., is now issuing a catalog for the rapid production of smooth, bright brass deposits.

15. Heavy Duty Grinders and Buffers
The complete line of Marschke Heavy Duty Grinders and Buffers manufactured by Vonnegut Moulder Corporation, 1845 Madison Ave., Indianapolis, Ind., is illustrated and described in a 22-page catalog now being issued by the company.

16. General Electric Immersion Heaters
Bulletin GEA-3195 now being issued by General Electric Company, Schenectady, N. Y., tells how to heat electroplating baths with General Electric Immersion Heaters.

17. Metal Cleaning Tips
The chemical classification and selection of alkaline metal cleaners is contained in a bulletin which has been prepared and is now being distributed by the Cowles Detergent Company, 7016 Euclid Ave., Cleveland, Ohio.

18. Profits in Air
The manner in which electrostatic air filters help industrial plants eliminate losses resulting from contamination of products by dust, smoke, and fumes is described in a four-page folder which is now being issued by American Air Filter Co., Inc., 242 Central Ave., Louisville, Kentucky.

19. Hammond Variable Speed Lathe
A four-page folder illustrating and describing a method by which speed changes of 1,500 to 3,000 r.p.m. can be obtained instantly on the Hammond VRO Polishing and Buffing Lathe is now being issued by Hammond Machinery Builders, Inc., 1622 Douglas Ave., Kalamazoo, Michigan.

20. Airway Ventilated Buffs
Cool cutting buffs for high speed buffing operations are illustrated and described in a 4-page folder now being distributed by Jackson Buff Corporation, 20-03 41st Ave., Long Island City, New York.

21. Polishing and Buffing Wheels
The Advance line of polishing and buffing wheels for the metal-finishing industry is described in a 28-page illustrated catalog now being issued by Advance Polishing Wheels, Inc., 844 W. 49th Pl., Chicago, Illinois.

Print plainly in filling out coupon for literature.

PRODUCTS FINISHING
431 Main St., Cincinnati, Ohio
I am interested in receiving the following literature reviewed in your January issue.

No..... No..... No..... No..... No.....
(Insert numbers denoting literature you want.)

Name ..... Title.....

Company .....

Company Address .....

City ..... State.....

Index TO ADVERTISEMENTS

Abbott Ball Company, The..... 41
Acme Manufacturing Company..... 62
Alrose Chemical Company..... 75
Alvey-Ferguson Company, The..... 13
Arrow Dura Wheel Co., Inc..... 72

Barton Mines Corporation..... 93
Bias Buff & Wheel Co., Inc., The.... 61
Blakeslee & Co., G. S..... 37

Cowles Detergent Company..... 8
Curran Corp., The..... 73

Dellinger Manufacturing Co..... 68
Detroit Rex Products Co...Fourth Cover
DeWitt Hotels, Incorporated.....101
Du-Lite Chemical Corporation..... 35
DuPont de Nemour & Co., Inc., E. I., Electroplating Division 27
DuPont de Nemour & Co., Inc., E. I., Finishes Division.....22, 23
Duriron Company, Inc., The..... 5

Egyptian Lacquer Mfg. Co..... 6

Globe Machine & Stamping Co., The. 43

Hamilton Emery & Corundum Co., The 85
Hammond Machinery Builders, Inc... 19
Hanson-Van Winkle-Munning Co..... 15
Harshaw Chemical Company, The... 38
Heatbath Corporation 31

Industrial Chemical Products Co..... 74
Industrial Sheet Metal Works, Inc... 56
International Conveyor & Washer Corp. 26
International Rustproof Corp..... 18

Jackson Buff Corporation.....52, 53
Juergens Co., Wm. A..... 73

Keystone Emery Mills..... 83
King, John 64
Kirk & Blum Mfg. Co., The..... 4

McAleer Manufacturing Company.... 83
Magnus Chemical Company..... 59
Mahon Company, The R. C..Third Cover
Masson Company, M. Ross..... 93
Mechanical Process Campany..... 72
Metallurgical Products Company.....100
Motor Generator Corporation, Division of Hobart Bros..... 85

Nellson Chemical Company..... 17
Norton Company 39

Oakite Products, Incorporated..... 1

Packer Machine Company..... 51
Park Chemical Company..... 49
Parker Rust-Proof Company..... 3
Pennsylvania Salt Mfg. Co..... 33
Philadelphia Quartz Company..... 55
Procter & Gamble..... 75

Ransohoff Incorporated, N..... 45
Roberts Rouge Company, The..... 84
Ronci Machine Company..... 67
Roxalin Flexible Lacquer Co., Inc., Second Cover
Rusticide Products Company..... 84

Solvents Recovery Service.....100
Sun Oil Company..... 25

Udylite Corporation, The..... 2
United States Treasury Department. 57

Varnish Products Co..... 74
Vonnegut Moulder Corporation..... 65

PRODUCTS FINISHING
PUBLISHED BY GARDNER PUBLICATIONS, INC.
431 MAIN STREET • CINCINNATI • OHIO